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In 1958 a project was begun in a small, isolated, rural farm community in Puerto Rico to provide nutrition education and improve other conditions of home and community living. Preliminary meetings, interviews, and examinations revealed the interest and great need of the 100 families. Progress reports were made after 1 year, 2 years, and 5 years. The 90 children were given 3 meals a day at the 2-room elementary school, along with instruction about good foods. The families were given information and demonstrations on home food production and nutrition. Housing, school, and public facilities (such as roads and water supply) were repaired or newly constructed. The community attitude toward self help was raised considerably. Although all problems were not solved, many deficiencies began to be corrected. Partly because of the on-going improvements at Dona Elena, the Governor of Puerto Rico in 1960 established a Commission for Improvement of Isolated Communities to administer other programs similar to the Dona Elena Project. (JAM)

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THE DONA ELENA PROJECT

by

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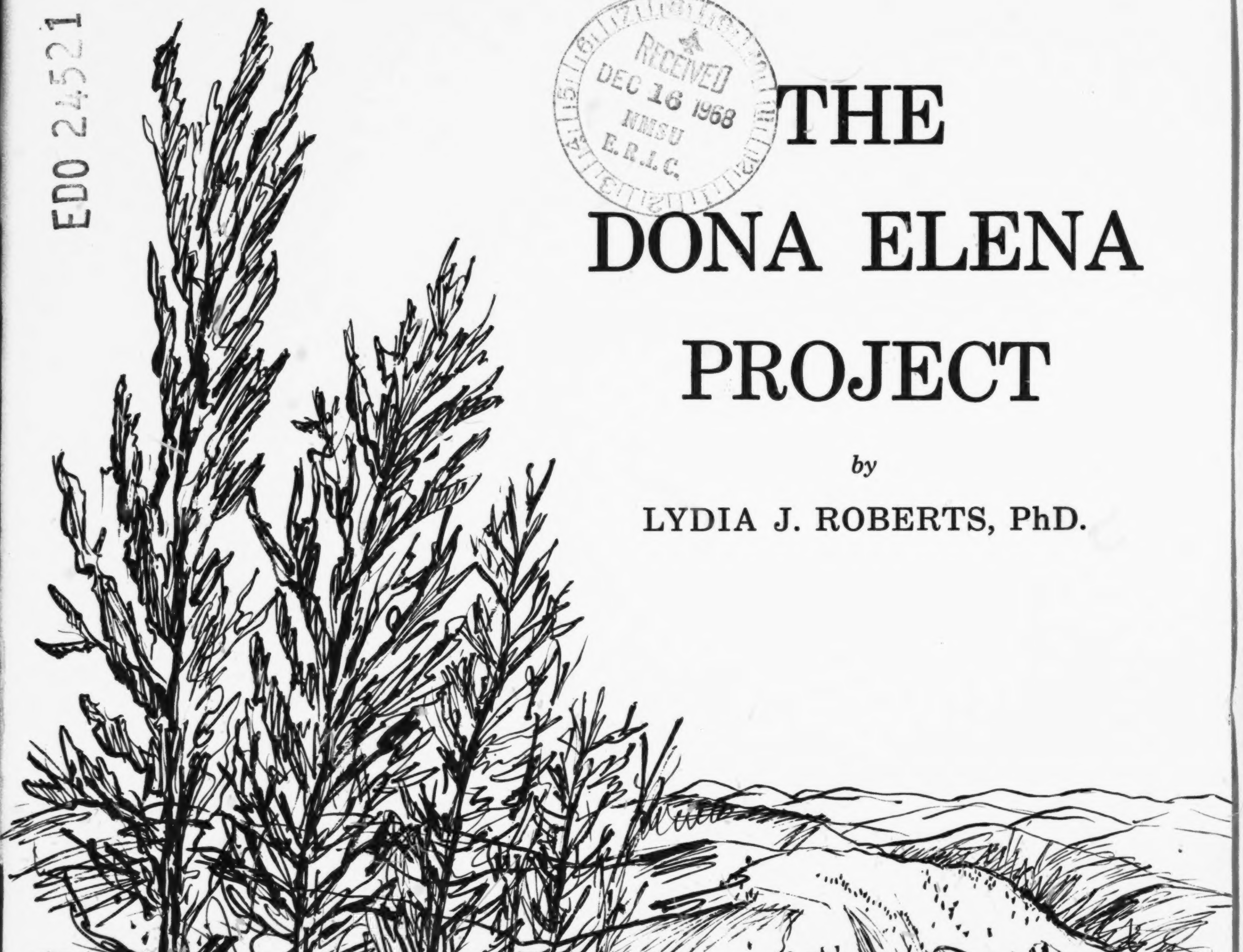

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Figure 1—Aerial view of part of Doña Elena. The building beside the pine trees is the lunchroom, the larger one at the left is the school house. Entrance to the area is over the winding road, part of which can be seen. Most of the houses are hidden by the hills.

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THE DONA ELENA PROJECT

A BETTER-LIVING PROGRAM IN AN ISOLATED RURAL COMMUNITY

by

LYDIA J. ROBERTS, PhD.

Department of Home Economics

University of Puerto Rico

1963

RC 003000

The University of Puerto Rico
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FOREWORD

The project herein reported has been under way for the past five years in an isolated mountain community in a rural barrio of Comerío, Puerto Rico. Its objective has been to help the families in the community to improve their nutrition and other conditions of home and community living. Although the project is still continuing it seems desirable to summarize the main procedures and some of the outcomes at this time, since they may serve as a guide in similar programs which are now being extended to other areas.

The project had its origin in a talk I had with the Governor on the needs of rural people in remote districts of the Island. He had expressed his gratification at the vast improvement in the general economy of the Island under the industrialization program and his assurance that there had been a marked rise in the standard of living of the many families that were profiting from the new industries. But he voiced his concern for the rural families in remote areas that the benefits of this program had not reached. These, he feared, were little better off than they had been before. What could be done to help such families?

In the course of the discussion which followed I chanced to tell him of a "pipe-dream" I had long had. This was to select a remote rural community of some 100 or so families, make a detailed study of all aspects of living conditions for every family, and then on the basis of the findings have all agencies concerned plan and carry out a concerted program designed to help raise the standard of living in every family. This idea was offered not as a solution to the problem but as an approach whose findings might point the way to procedures that could help to solve the problem in this and other areas. The Governor was enthusiastic about the idea and decided that it should be put into action.

It was intended that the Governor would call the heads of the agencies concerned to a meeting to consider the plan and if they approved to set up a committee to direct the project. Before this meeting could be called the 1956 hurricane came and all the Governor's attention as well as that of agency heads was focused on the problems it incurred. Finally the Governor suggested that we go ahead with the project without waiting for him and he requested the chief of the budget bureau to provide the additional funds that would be needed. It was assumed that the work involved would be largely carried by agency employees as part of their regular duties. The additional funds would be needed to employ some local workers in the area chosen, the purchase of a jeep, and miscellaneous expenses. These funds were later supplied through the Department of Health.

Left with the responsibility for getting the project under way, it seemed wise to limit the scope at the beginning and to concentrate on nutrition which is one of the major problems in such areas. One practical reason for choosing this aspect for first emphasis was that it could be sponsored by the already-existing Puerto Rico Nutrition Committee and would thus obviate the necessity of setting up a new Committee. The membership of the Puerto Rico Nutrition Committee includes representatives of all agencies and organizations whose activities are in any way concerned with the nutrition of the people. The proposal was presented to the Committee which unanimously agreed to sponsor the project, and a sub-committee of its members was made responsible for its direction and operation.

This committee consisted of representatives of the Division of Nutrition of the Department of Health, the School Lunch Program of the Department of Public Instruction, The Food Distribution Division of the United States Department of Agriculture and the Department of Home Economics of the University of Puerto Rico. These and other agencies contributed liberally in service of their workers and in general support. The Food Distribution Division of the United States Department of Agriculture furnished foods for the meals served at the school and its nutritionist gave much service to the program. The School Lunch Division of the Department of Public Instruction built a new lunchroom and provided the additional foods and workers needed to prepare and serve three meals a day to the children. It made available, whenever needed, the services of a four-wheel-drive truck to carry heavy supplies to the area and its director served as one of the active sponsors of the project.

The Department of Health provided the extra funds needed to carry the program and much service from staff members. The chief of its Bureau of Nutrition was one of the active sponsors and other nutritionists assisted in many aspects of the program. Its medical nutrition consultant carried out a parasite control program and together with a nutritionist organized a clinic for infants and pre-school children. Its Bureau of Sanitation cooperated in the sanitary aspects of the program and its Division of Dental Hygiene made the dental examinations.

The Department of Home Economics of the University of Puerto Rico freed a large portion of the time of the writer to be over-all director of the project. It also gave full-time with salary of one of its staff members to be the home economist to live in the area and be locally in charge of the program and a full day a week to the department's agronomist to serve as one of the major sponsors. It also provided office space and a large part of the time of a secretary for secretarial service and the management of the budget and accounts.

The home economist and agronomist who lived in the area and worked directly with the people and the teachers in the school were the ones who did the day-today work and were largely responsible for the excellent spirit developed in the community and the results that were attained. They would, however, have been unable to do as much had it not been for the guidance, encouragement, and actual service rendered by the sponsors. Left alone in an isolated mountain community under primitive conditions of living and with few resources they could easily have become discouraged and unable to continue. But the sponsors served as their allies and support from outside. One or more of them visited the community at least once a week to discuss problems and give what help they could in solving them. They helped plan and carry out meetings with the people, usually on Sunday afternoons. They made contacts with government agencies for help in providing facilities—electricity, latrines, drums for collecting rain water, and other services. They were constantly on the alert to recognize needs of the community and the workers and to find ways to meet them. With this constant source of encouragement and help the workers were able to live and work happily and effectively with the people.

Some who read the report will say that we did too much for the people. Perhaps we did. But they were so isolated by bad roads with no facilities for outside contacts and the incomes of the majority of families were so low that what we did seemed justified in order to get things started. These things were, moreover, mostly what any good neighbor would do for another. We had a jeep; so we brought in cement to build stoves, the families paying only for the cement. We located drums and brought them in by 4-wheel-drive truck. The men came for them, contributed twenty-five cents to a common fund, and carried them away over the hills to their homes. The Department of Health gave the latrines; we brought them in by 4-wheel-drive truck and the men came and carried them away on their heads. We gave them calabaza seeds and yellow sweet potato vines—which cost us nothing—and a few packets of other seeds. Most of these things would not have been done without our help. In any case the people are now taking on more responsibility for solving their own problems as the present report will show.

The material of the report is presented in six sections. Section one outlines the purposes and over-all plan of the project. Section two describes the conditions of living found in the area at the time the study was undertaken and which formed the basis for the program. It involves not only nutrition but all major physical aspects of living. Section three describes the program carried out during the first year and the results that could be observed at that time. Section four outlines the changes made in the procedures that seemed indicated on the basis of the first year's record and describes the program incorporating them that was carried out during the second year, and the progress made. It has seemed desirable to report the first two years separately even at the expense of some repetition in order that the steps in the development of the program might be preserved. Section five reviews briefly the status at the end of five years. Section six summarizes and evaluates the program and describes briefly the plan for extending similar services to other isolated areas in the Island.

ACKNOWLEDGMENTS

It would be impossible to acknowledge personally all the many persons that have contributed in some way to this project for their name is legion. But a few at least must have special mention. As director of the project and writer of this report I wish first of all to acknowledge with gratitude the collaboration of those who served with me as the chief sponsors of the project and who carried the

major responsibility for its operation: Dr. Esther Seijo de Zayas, then Chief of the Bureau of Nutrition of the Department of Health; Mrs. Margarita Pont Flores, Director of the School Lunch Program; Mr. Luis Berrios, Agronomist of the Department of Home Economics, University of Puerto Rico. We extend our thanks also to the heads of the agencies which these workers represent for their generosity in contributing the time of these workers and for their general support.

Our thanks are due also to others who rendered special services to certain aspects of the program. To Mr. Virgilio Rabainne, Administrator of the Food Distribution Division of the U.S. Department of Agriculture who provided the food for the nutrition program and to Marta Coll, nutritionist for this agency who gave much time and service not only to the feeding program but to other aspects as well. To Virginia Lara and Nexy Quiñones, nutritionists for the Division of Nutrition of the Department of Health, who took much of the responsibility for arranging for the original weighing and measuring of children and for the medical examinations of children in both areas, who did many of the home interviews and helped in their tabulation and in many other ways. To Dr. Nelson Fernandez, nutrition consultant for the same Division, who conducted the parasite control program and who established and conducted for a year a clinic for infants and pre-school children. To Dr. Elmer Severinghaus of the Institute of Nutrition of Columbia University who made the initial medical examinations and follow-up ones at the end of the year, and to the Williams and Waterman Fund that made his services available. To Dr. Francisca Guerra, Chief of the Bureau of Oral Hygiene of the Department of Health, under whose direction examinations were made of the teeth of the children in the two communities and to the home economists and nutritionists from various agencies that helped in making the family interviews.

At the local level the work was centered in and around the school and the Superintendent of Schools of Comerío, Mr. Victor Rodriguez Bou, was the chief sponsor. We are greatly indebted to him for making all facilities of the school available for the project; for selecting suitable teachers for the school; for attending and contributing to practically all meetings with the people; and for giving his support and help in every possible way. We are grateful to the mayor, Mr. Eliseo Guerrero, who lent his support to the entire program especially by supplying equipment and operators for improving the roads, but also by attending and contributing to meetings with the people and voicing his approval of the program.

We wish to thank the teachers of the school, especially José Gorritz and Francisco Gonzalez, each of whom served for two years, for making the school and surroundings attractive and inviting; for improving the attendance of children at school and their eating habits in the lunchroom; and for their general spirit of interest and cooperation. We extend our thanks also to "Doña Suncha" and her helpers in the lunchroom for their faithfulness and efficiency in preparing and serving the three meals a day to the children and for their interest which led them to attend meetings and do service "beyond the call of duty;" to the seven community leaders who developed into a group now worthy of that name and to all the families of Doña Elena that received us graciously in their homes, responded encouragingly to our teachings and who are now earnestly trying to improve their conditions of living.

But our biggest debt we owe to the two young people, Carmen and Alejandro Santiago who had the courage and devotion to live in the area and do the day-to-day work with the people. They literally "mothered" and "fathered" the project and the community and are largely responsible for the excellent spirit developed in the people and for much of the good results that were attained. What is more important, they established a precedent for such type of service. When the project was being planned we were assured that it would be impossible to find trained persons who would live and work in such isolated areas. But these two young people did just that, and they radiated such enthusiasm and satisfaction with the work that many others have been inspired to follow in their footsteps. Indeed, as this is being written we have some 40 more of them, home economists and agronomists, living and working in 20 other similar areas. But credit is due not only to Carmen and Alejandro but to the whole Santiago family. Their home was our half-way house on the way to Doña Elena. It was there that we left our car and took to the jeep for the jolting ride to Doña Elena; it was there that we stopped on our return to find coffee and a cool drink waiting us; it was there that we were served dinner or lunch when we went to Sunday or evening meetings in Doña Elena. It was on their porch that we held conferences when the roads to Doña Elena proved to be impassable. It was their jeep that we borrowed when ours failed us. It was another son of the family, Antonio, who took Alejandro's place for the third year. So our heartfelt thanks we tender to Don Juan and Doña Natividad Santiago and their three children, Carmen, Alejandro, and Antonio.

In a different category from those whose services to the operation of the project have been acknowledged stands the Governor, Luis Muñoz Marin, to whom we are indebted for making the project possible and for his interest and support which have continued through the years. He visited the community twice, once near the beginning and once toward the end of the second year. He talked with the people that gathered round and visited the school and some of the homes. The contagion of his interest encouraged the families as well as the workers in what they were doing to improve conditions of living in the community. Uppermost in the Governor's mind always was the thought of how many other communities there were in the Island in need of similar service. The outcome was that through his influence a law was passed establishing a Commission to carry out similar programs in other isolated communities. This was the most significant and gratifying result of the program, and it made all the time, efforts, and money involved in the project well worth while.

Lydia J. Roberts

University of Puerto Rico, 1963

CONTENTS

PART I

PURPOSE AND GENERAL PLAN 3
- The Community 3
- Meetings with the people 4
- The home interviews 4
- Nutritional check-up of the children 5
- The control group 6
- Later developments 6

PART II

CONDITIONS AT THE BEGINNING AS REVEALED BY THE HOME INTERVIEWS AND MEDICAL AND DENTAL EXAMINATIONS 7
- The Families 9
  - Size of families. Sex and age distribution of members. Natural versus extended. In relation to age of parents and children.
- Composition of families 11
- Milk 22
  - Amount per person 22
  - Amount school lunch 22
  - Total available 23
- Educational Status 12
  - Highest grade in school attained. Ability to read.
- Occupation and Income 14
  - Occupation of chief breadwinner. Land available for use and ownership of holding. Money income for preceding year. Summary.
- Home Production of Foods 18
  - Viandas. Garden vegetables. Fruit trees. Cows. Goats. Chickens and eggs. Pigs. Rabbits. Summary.
- Diets of the Families 20
  - Meals on the day of the interview 20
  - Milk 22
    - Amount of milk per person from home supply 23
    - Amount provided by the school lunch. Total milk available 23
  - Protein foods. Frequency of using specific protein foods 25
  - Viandas. Other vegetables. Contribution of onions and tomato sauce 25
  - Cereals and beans. Amount of rice per capita 27
  - Fats, sugars and desserts 28
  - Canned vegetables and fruits 29
  - Foods that families say they need more of 30
  - Adequacy of the diets. Summary 31
- Physical Status of the Children 33
  - Height for age compared with standards. Underweight for height and age. Medical findings. Dental findings. Summary 39
- Factors Other than Nutrition 40
  - Kitchens and facilities for cooking and eating. Houses and surroundings.
- Community Facilities and Services 44
  - Roads. Water and electricity. Service of government agencies.
- Contacts of housewives outside the home 45
- Summary 45

PART III

THE FIRST YEAR'S PROGRAM AND SOME OF ITS RESULTS (1958-59) 49
The Program 49
Community workers. House for workers.
The feeding program. The meals.
The weighing and measuring program 51
Meetings with the people 51
The motivating meeting. Later meetings. Area meetings.
The home food production program 54
Goals for a home food supply. Gardens. Cows. Chickens. Rabbits.
Home improvement 55
Kitchens. Other aspects of the home.
Facilities 56
Electricity. Roads. Latrines. Drums and eaves for catching rain water.
Progress During the First Year 58
In the growth of children. The matched group 58
Average gains in height and weight of matched groups 59
Percentage of expected gains made by children in each group 61
Number of times each partner made the best gains 61
Some factors in the failure to make expected gains 62
School attendance. Number of meals eaten. Loss of weight during vacation periods. Parasites.
In the home production of foods 63
Garden vegetables. Yellow sweet potatoes.
Cows. Chickens. Rabbits.
In housing and other aspects of living ....
In community facilities 65
Interest and attitude of the people 65

PART IV

THE SECOND YEAR. (1959-60). THE PROGRAM AND SOME SIGNS OF PROGRESS 67
Stimulating Better Attendance at School 69
Reports to parents of first year's record. Influence of teachers.
Changes in meals. Higher percentage of meals eaten. More "clean plates."
Nutrition Course for Teachers 72
Parasite Control Program 73
Growth of Children the Second Year 73
Height. Weight. Other signs of improvement.
New Emphasis on Home Food Production 75
Gardens. Yellow sweet potatoes and calabaza. Fruit trees. Chickens.
Improvement in the Diets of the Families 76
The breakfast program. Other meals.
Non-nutritional Aspects of the Program 77
Housing 77
Improved kitchens and cooking facilities 78
Cleaner surroundings. Latrines and drums for catching rain water 78
Electricity and electric appliances. Roads 78

PART V

STATUS AT THE END OF THE FIFTH YEAR (1963)

Changes in the Community 81
    In the families 83
    Size and age composition 83
    Income 84
The Nutrition Program in the School 84
    Improvement in attendance and meals eaten 84
    Changes in students, teachers, and workers 85
    Growth of children 86
        The first two years 86
        Growth of matched pairs over a three year period 87
Public Facilities 88
        Water
        Electricity and electric appliances
        Roads
Housing 92
    Surroundings.
    Latrines.
Educational Program with Families 94
    Home food production 96
        Gardens. Fruit trees. Animals for milk and meat.
    Family meals 98
The Work Ahead 101
Larger Outcomes of the Project 103
    The Commission for Improvement of Isolated Communities 103

PART VI

SUMMARY 107

LIST OF TABLES

Page

1. Size of Families and Number of Persons in Each Size, by Sex 9
2. Age and Sex Distribution of 728 Persons 10
3. Comparison of Age Distribution of Doña Elena Families with That of Rural Families in the 1946 Study 11
4. Highest Grade in School Completed by 413 Persons 11 Years of Age and Over, by Age and Sex 12
5. Percentage of Persons 8 Years of Age and Over That Cannot Read 14
6. Annual Income for 100 Families and Average Incomes, by Groups 15
7. Foods Used by 100 Families on the Date of the Interview 22
8. Average Amounts of Milk per Person per Day: A. From Home Supply, and B. Plus that from the School Lunch 23
9. Number of Families Using Four Types of Foods with Specified Frequency 25
10. Amounts of Rice per Person per Day and Averages by Groups 27
11. Average Amounts of Fat and Sugar Available per Person and Calorie Equivalent of Fat 29
12. Percentage Deviation From Average Weight for Height and Age of Doña Elena and Control Children at the Beginning, August 1958 36
13. Clinical Findings for Doña Elena and Control Children and Doña Elena Adults ... 37
14. Dental Conditions of Doña Elena and Control Children and Doña Elena Adults ... 38
15. Types of Cooking Utensils Owned by Families 42
16. Age, Height and Weight of Boys in Matched Groups at the Beginning (August 1958) 60
17. Age, Height and Weight of Girls in Matched Groups at the Beginning (August 1958) 60
18. Average Gains of Matched Groups the First Year 59
19. Percentage of Children in Matched Groups Making Expected Gains in Height and Weight (First Year) 61
20. Percentage of (A) Attendance of Children at Meals, and (B) of Children Having "Clean Plates" on Days They Were Present (Second Year) 72
21. Percentage of Expected Gains in Height and Weight for Doña Elena Children for the Second School Year 74
22. Improvement in School Attendance for Three School Years (August 1958—May 1961) 85
23. Types of Meals First, Second and Fourth Years 99
24. Use of Milk and Eggs by Families First, Second and Fifth Years 100
25. Growth of Matched Groups Over a Three-year Period 87

LIST OF FIGURES

Figure *Page*

1. Aerial view of Doña Elena ... III
2. A small tobacco farm ... 17
3. A typical kitchen as found in the beginning ... 40
4. One of the houses rated as needing to be replaced by a new one ... 40
5. The house for our workers as we found it ... 48
6. The same house two years later ... 48
7. Recent view of the house and surroundings ... 48
8. The motivating meeting. Dr. Zayas explains the results of the medical examinations ... 52
9. Sylvia Rodriguez explains the basic food chart and how the medical findings were related to lacks of these foods ... 52
10. Mr. Berrios explains how they can get all the protective foods by raising them ... 52
11. House in which the first cement stove was built for demonstration ... 57
12. A typical kitchen and three-stone fogon ... 57
13. A sample of a new kitchen with a cement stove ... 57
14. Device for handwashing with minimum amount of water ... 68
15. Children of third and fourth grades using the device ... 68
16. The new lunchroom and children lining up to enter ... 68
17. Teacher putting a star on a chart while a child stands by with a clean plate ... 68
18. Old house improved by new kitchen, cement stove, etc. ... 79
19. A sample of the old rutted, muddy road ... 90
20. View of the same road, now paved ... 91
21. One of the new houses built with the help of the Social Program's Administration ... 92
22. New house built by the owner ... 94

22A & B. The old house and new one that replaced it ... 95

23. New house beside the old one ... 95
24. Carmen, Antonio and the housewife picking acerolas from one of the trees given the family in 1958 ... 105
25. Junction of new paved roads from Comerio and Naranjito ... 113

LIST OF CHARTS

Page

1. Highest Grade in School Attained by Persons 11 Years of Age and Over, by Age and Sex ... 13
2. Annual Income of 100 Families ... 16
3. Types of Meals Families had on the Day of Interview ... 21
4. Percentages of Families that Say They Need More of Specified Foods ... 30
5. Nutrients in a Typical Rice-Beans-Vianda Diet and Foods that will Supplements its Deficiencies ... 32

6-7. Heights and Weights of Doña Elena Children Plotted on a Standard Growth Chart ... 34-35

8. Housing Needs of 83 Doña Elena Families ... 43

PART I

PURPOSE AND GENERAL PLAN OF THE PROJECT

PURPOSE AND GENERAL PLAN OF THE PROJECT

For the past five years the project for the betterment of home and community living herewith reported has been under way in an isolated mountain community in a rural barrio of Puerto Rico. Its objective has been to demonstrate what can be done to improve the conditions of living of the people through a coordinated program concerned with the needs of all families in the area.

The Community.

In selecting the community for the project it was agreed that it should be a distinctly rural one with little or no contact with an urban center; that it be a relatively poor area with few if any large land-owners; that it have in the neighborhood of 100 families; that it have a school and that the School Superintendent be interested and willing to cooperate in the project. At the request of the directors of the Regionalization Program of the Department of Health it was agreed to choose a community within the area covered by the Bayamón District Hospital. Within this area one town, Comerío, had been chosen for more intensive work. This town had already set up a Health Planning Committee, with the Superintendent of Schools as chairman and with a membership comprising representatives of all government agencies and of each barrio in the town. This Health Planning Committee formally requested that the project be located in some barrio of Comerío, and when this was agreed upon, helped to select a community meeting the requirements.

The community chosen was Doña Elena Alto, a sub-barrio of Comerío.* It is located in a mountainous section in a tobacco area. It consisted of some 100 homes scattered among the hills (Figure 1). The school, which is the center of activities, is about an hour's distance from Comerío, or two hours from San Juan. It may be reached from either the Comerío-Palomas road or from Naranjito. In either case, the last five miles or so of the trip had to be completed by jeep, or on foot or horseback. The "roads" were mere trails, winding over and around steep hills. They were rough and rutted and in the rainy season were deep in red, clay mud. (Figure 19.)

The school is located on a high hill with a view in all four directions. It is an elementary school with grades from one to six. At the time it was first visited it was a two-room school with two teachers and about 90 pupils. There was a small

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**Puerto Rico is divided into 96 municipalities or towns. Each municipality is sub-divided into barrios. This is comparable to the continental division of a state into counties, each county into townships. A municipality usually has only one "town," the rest of the area is rural. The town is the trading center and the seat of government. It has a mayor and other officials, and the usual public buildings, including a city hall, a municipal hospital and health center and a high school. Most of the Island's public service agencies also have representatives there: Public Welfare, Public Works, Water Resources, Acqueducts, Farmer's Home Administration, Agriculture Extension Service.*

school lunch-room with two women workers. The children observed in the school appeared to be poorly nourished and small for their age. The 5th and 6th graders looked more like 2nd or 3rd grade ones in size. This seemed to be an ideal place for carrying out a human demonstration that "nutrition makes a difference" in the growth, physical status and health of people.

For practical reasons which have been noted in the foreword it was decided to start the program as a nutrition project letting other aspects enter in as the need should arise. The program was to be centered around the school and the school lunch-room, and the growth and physical status of the children were to be used as one index of the results of the program. All families in the area were, however, to be included in the educational program.

Nutrition in this project was interpreted in its broadest sense. It included the type of meals and the kinds and amounts of foods eaten by the families, the foods produced for home consumption and the nutritional status of individuals, especially children. As basic to these the program was of necessity concerned with socio-economic factors that determine the ability of a family to attain good nutrition, namely; the occupation and income, the size and make-up of the family, the educational status of family members and even the kind of kitchen and facilities for cooking and serving food. It is thus seen that it comprised many of the important aspects of family living.

Meeting with the People.

Before this community was definitely decided upon a meeting of the people of the area was called by the Superintendent of Schools. The proposed plan was explained to them and they were asked to consider whether they wished it to be undertaken in their community. Their response was decidedly in favor of it. As one man expressed it, "I am sure that no one in this room, or anyone else, could possibly object to a plan like that. It is a 'saint' project you have brought us." Those present agreed but they asked that since not all families were represented another meeting be held to explain it to others so that all would understand it. This second meeting was held and again all present agreed that they would welcome the project and cooperate in it.

The Home Interviews.

The cooperation of the families having been assured visits were made to the homes and interviews obtained regarding all factors relating to the nutrition and food supply of the families and other pertinent items. These included:

1. The size and make-up of the family with names and ages of family members.
2. The educational status of all persons; the highest grade in school attained, and their ability to read.
3. The chief occupation of the breadwinners and the total annual family income.
4. A record of the meals eaten by the family on the day preceding the interview.
5. The frequency with which the family used each of the basic foods—milk, meat, vegetables, etc.—and the quantities used during the week.
6. The extent of home production: the raising of gardens and fruit trees, and the keeping of cows, chickens, pigs, goats and rabbits.

7. The facilities for cooking and eating, including the type and condition of the kitchen and the kind of stove and the fuel used.
8. What the families felt were their needs in respect to food.
9. What contacts families have with agency programs and other educational sources.

The interviews were made by home economists and nutritionists from the Department of Health, the Home Economics and School Lunch Divisions of the Department of Public Instruction, the Agricultural Extension Service and the Department of Home Economics of the University of Puerto Rico. These workers were first given instructions in the details of making the interviews and filling out the schedules. They then visited the homes and obtained the information on all items in the schedules. Owing to the distances and the difficulties involved in reaching the homes only one, or at most two, schedules a day were all that could be obtained by a worker. The data from the schedules were tabulated by the staff of the Department of Home Economics at the University of Puerto Rico, with participation of nutritionists from the Department of Health.

Nutritional Check-up of School Children.

Since the improvement in the nutrition of school children was to be one of the main criteria for judging results of the program, a check of the nutritional status at the outset was made. To notify parents to bring their children for examinations, a jeep carrying a loud-speaker was driven over the road on the top of the ridge and the notice of the time and place of the examination broadcast. When the workers arrived at the time appointed the school rooms were full of people, some of whom had already been there for an hour or so. Whole families were there; fathers, mothers, and children of all ages and in numbers from one to ten or more per family. They were taken for measurements and examinations by family groups; parents as well as children were examined.

Nutritionists from the agencies concerned routed the families for examinations, did the weighing and measuring, and acted as recorders for the physicians doing the examinations. Weights were taken on a Fairbanks scale by two workers. One took the weight and reported it, the other checked and recorded it. Height was taken on a stadiometer made according to the specifications of the Iowa Research Center, using standard procedure as described elsewhere (page 51). Again there were two workers. One put the subject into proper position and took his height, the other checked both the position of the subject and the reading and recorded the measurement. As soon as all members of a family had been weighed and measured they were routed to the physicians for medical examinations of nutritional status. The physician in charge was a member of the staff of the Institute of Nutrition in the School of Public Health of Columbia University. His services were provided by the courtesy and expense of the Institute and the Williams and Waterman Research Fund. He was assisted in the examinations by local pediatricians from the Department of Health.

The examinations were not completed until well into the afternoon. This meant that many of the families were there from six to eight hours with no food except a sandwich and a cup of "café con leche" which was served them by the nutritionists. It rained hard all day so that they were obliged to stay in the crowded school rooms. It is a tribute to the orderliness and courtesy of the people that everyone, including children, waited their turns quietly and patiently. When the examinations were over the roads had become impassable even for a jeep and so the more than a dozen workers had to plod the five miles to the main road by foot through mud and water, over the slippery clay hills. They were a sorry, muddy sight when they reached the main road. It was a new experience for most of them, but they recognized that it was a usual one for the people who live in the community.

Dental examinations were made of the school children and some of the parents at a later date by dentists from the Department of Health and the findings were tabulated by them, as will be reported later.

The Control Group.

If the growth of school children was to be used as one index of progress it was desirable that there be a control group. Such a group was secured in a similar community just over the mountain ridge from Doña Elena. Through the courtesy and interest of the Superintendent of Schools a large group of children was assembled at the school even though it was during the summer vacation. These children were weighed and measured by the same workers and techniques as in the other school. The same physician did the medical examinations assisted by another pediatrician from the Department of Health. Dental examinations were also made of this group by the Division of Dental Hygiene. No further contact was had with this control group until the end of the first year when they were again checked by the same procedures. This school had no lunch-room or nutrition program but the Superintendent of Schools and the parents were hoping to have them in another year. In the meantime the children furnished a good control group for the Doña Elena children.

Later Developments.

As the project got under way it soon became apparent that it could not be confined to nutrition. Problems of roads, water, latrines, electricity and housing were constantly being raised by the people, and before the end of the first year the program had of necessity developed into an all-round one for bettering conditions of living in the homes and the community. The project workers in their visits to the homes obtained information on conditions of housing, water supply, sanitation and other factors not obtained in the original interviews and included these in their educational and service programs. Nevertheless, emphasis for the major part of the first year was given to the nutritional aspects as described above.

Note.

In the next section the findings from the family interviews and the medical and dental examinations are given in some detail for the benefit of workers in similar programs. The reader interested in a more general way may obtain a sufficient background by reading the summaries which are given at the end of each major topic.

PART II

CONDITIONS AS REVEALED BY THE INTERVIEWS AND MEDICAL AND DENTAL EXAMINATION

THE FAMILIES

Interviews were obtained for 100 families living among the hills in the area selected for the project. Although it was later found that a few families did not strictly belong to the Doña Elena community, since the conditions of living were similar for all, findings for the 100 families are reported here.

Size of Families.

In these 100 families there were living 728 persons. This makes an average of about 7.3 persons per family. This is considerably more than the 5.9 which was the average found for all rural families in the Island-wide study made in 1946. The majority of the families are thus very large. (Table 1). Nearly two-thirds of them (64%) consist of six or more members, and 28 per cent of 10 or more.

Indeed, 16 of the families contain from 12 to 16 persons. The significance of these large families is more apparent when the number of individuals involved is con-

TABLE 1. SIZE OF FAMILIES AND NUMBER OF PERSONS IN EACH SIZE, BY SEX

	A.		B. Persons in Families					
Size of Family	Total No. & %		Total No. & %		Male No. & %		Female No. & %	
All families	100		728	100	377	100	351	100
Less 6	36		130	17.9	66	17.5	64	18.2
1	2		2		1		1	
2	3		6		3		3	
3	12		37		18		19	
4	11		44		24		20	
5	8		41		20		21	
6-9	36		259	35.5	134	35.6	125	35.7
6	12		72		39		33	
7	8		57		28		29	
8	6		49		26		23	
9	10		81		41		40	
10 or more	28		339	46.6	177	46.9	162	41.1
10	6		61		31		30	
11	6		66		39		27	
12	8		90		47		43	
13	4		62		24		38	
14	1	16	14		12		2	
15	2		30	16.3	15		15	
16	1		16		9		7	
	Average 7.3							

sidered. Of the total 728 persons, 399, or nearly half (46.6%), live in house-holds of 10 or more persons, nearly one-fourth of them (24.4%) in ones consisting of 12 to 16 members. Since, as is seen later, the majority of the houses consist of only one to three rooms, the extent of over-crowding and unsuitable conditions of living, especially sleeping, becomes apparent.

Sex and Age Distribution.

In this community of 728 persons the males somewhat outnumber the females: 51.8 percent are males, 48.2 percent are females. In age, this is predominantly a younger group than commonly found (Table 2). Two-thirds of all persons (65.7%) are under 21 years of age, and over half of them (55.3%) are under 16 years. Over one-fourth (26.7%) are in the age-group 16 to 39 years, and 18 per cent are 40 years of age or older. A comparison of this age distribution with that found in the 1946 Island-wide study (Table 3) shows that the Doña Elena group has a significantly larger proportion under 16 years of age (55 vs. 49%) and fewer in the young adult group of 16 to 39 years (27 vs. 34%). The proportion 40 years of age and over is about the same in both studies, though Doña Elena has a slightly higher percentage of persons 60 years of age or more (6.3 vs. 5.7%). Doña Elena, therefore, has a larger than usual group of dependents, that is, children under 16 years of age and adults 60 years of age and older (61.8 vs. 53.7%). It is significant that the young adult group 16-39 years of age comprises only a little over

TABLE 2. AGE AND SEX DISTRIBUTION OF 728 PERSONS

	Total %	Male* %	Female* %
All persons	100.0	100.0	100.0
Under 21 years	65.7	65.8	65.5
under 2	6.7	5.8	7.6
2-5	14.1	15.9	12.2
6-9	14.9	13.8	15.6
10-12	10.4	8.2	12.2
13-15	9.2	10.6	7.6
16-20	10.4	11.4	9.3
21 years and over	34.3	34.2	34.5
21-24	5.1	4.6	5.7
25-29	4.2	4.3	4.3
30-39	7.0	6.6	7.4
40-49	8.0	9.0	6.8
50-59	3.7	3.7	3.7
60-69	6.3	6.1	6.6
70-79			
80 and over			

*Males 51.8%; Females 48.2%

one-fourth of the total persons (26.7%) as compared with one-third (33.8%) for the former study. This is in part explained by the fact that some persons of this age group have gone to the states or elsewhere to seek employment.

TABLE 3. COMPARISON OF AGE DISTRIBUTION OF DONA ELENA FAMILIES WITH THAT OF RURAL FAMILIES IN THE 1946 STUDY*

Age, years	This Study %	"Patterns of Living" 1946 %
All Persons	100.0	100.0
Under 16 years	55.3	48.5
Under 2	6.7	5.8
2-5	14.1	13.9
6-9	14.9	13.6
10-12	10.4	9.1
13-15	9.2	6.1
16-39 years	26.7	33.8
16-24	15.5	17.4
25-29	4.2	5.7
30-39	7.0	10.7
40 and over	18.0	17.7
40-49	8.0	7.5
50-59	3.7	4.5
60 and over	6.3	5.7

*Roberts and Stefani, *Patterns of Living in Puerto Rican Families*, University of Puerto Rico, (1949).

Composition of Families.

Natural versus Extended. In view of the large size of families it is pertinent to inquire to what extent they are made up of only natural family members—father, mother, and children—or are extended by others living in the home. Of the 100 families 72 consist of only the basic family group and 28 have other members. This is a smaller proportion of outsiders than was found in the 1946 study, in which 37 per cent of all rural families contained others than the basic family group. In the present study it is the families with 8 to 10 members that have more outsiders than either the larger or smaller families.

In Relation to Age of Parents and of Children. Since it was known that some young adults had left the area for work outside it was questioned whether the community might contain an abnormally large proportion of families of older people. It was found that about one-fifth (21%) of all families can be so classed. A few of these are older persons or couples living alone (5%); some are older persons with grown sons and daughters (10%); and others are older adults with grandchildren (6%). Whether this is a larger group of "finished" families than the average for all rural families we have no way of knowing. In any case over three-fourths of Doña Elena families (79%) are made up of adults in the 21 to 50 age groups, all with children ranging from under one year up to 20 years of age.

Educational Status

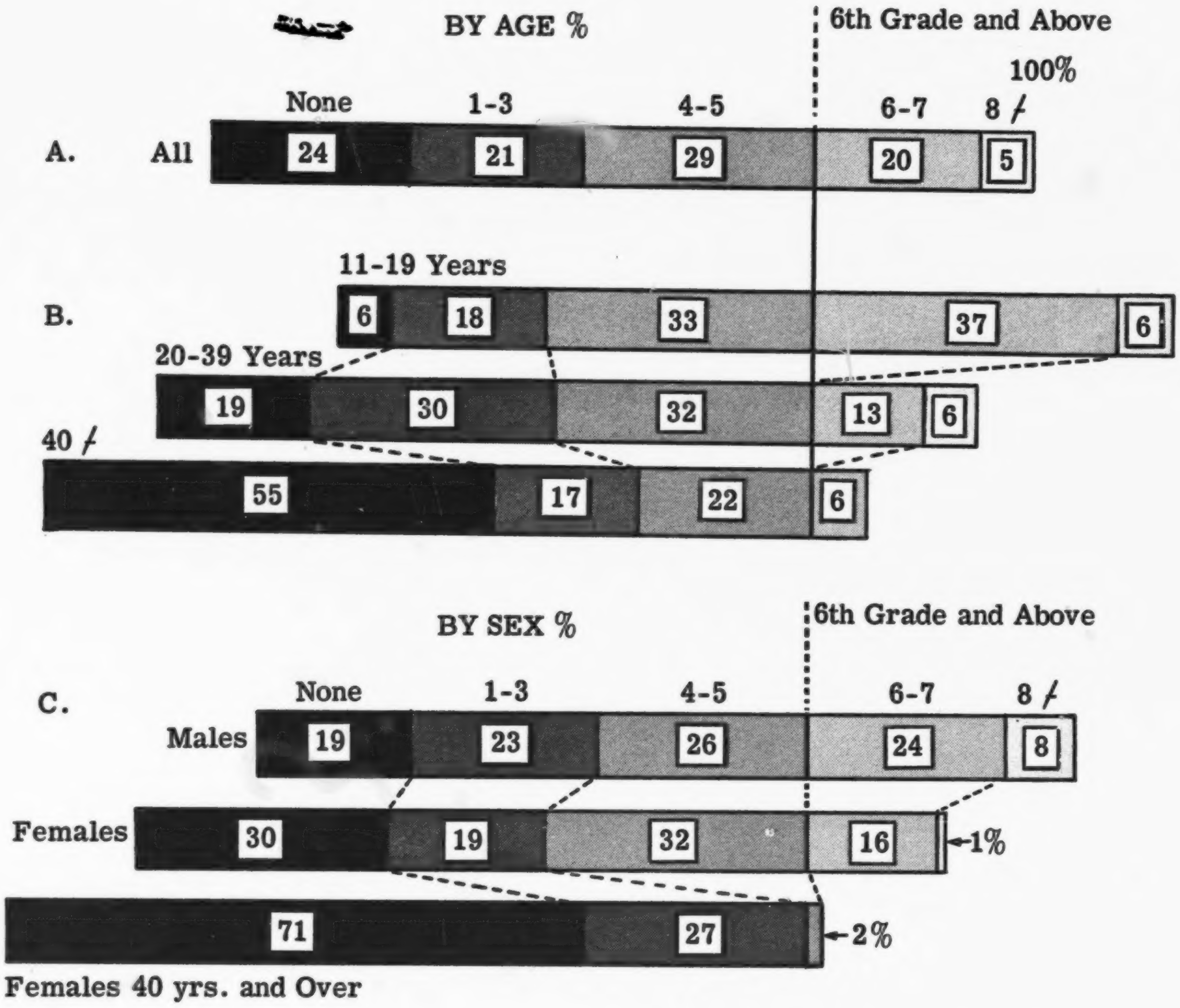
Highest Grade in School. The educational level of the community was assessed by two criteria: (1) by the highest grade in school that had been attained by all persons eleven years of age and over; and (2) by the ability of the same age groups to read (Table 4). The small amount of schooling families in this community have had is best seen in Chart 1 which shows graphically the percentages of persons 11 years of age and older that have attained several grade levels in school, (A) by age group, and (B) by sex. A dividing line has been drawn in each chart at the 6th grade level as this is commonly regarded as a minimum standard of education desirable. The farther to the left of this 6th grade line and the blacker the bars, the poorer is the educational status. It will be noted that the largest portion of all bars is left of the 6th grade level. For the group as a whole, three-fourths of all persons (74.8%) have had less than six years of schooling, one-fourth of them have had none at all (24.2%) and 21.3 per cent no more than one to three years. This makes nearly half (45.5%) that have had little or no schooling. Only 25.2 per cent have gone through the 6th grade or beyond.

TABLE 4. HIGHEST GRADE IN SCHOOL COMPLETED BY 413 PERSONS 11 YEARS OF AGE AND OVER, BY AGE AND SEX

Age group and sex	Total %	None %	Grade Completed 1-3 %	4-5 %	6-7 %	8 %	Some high school %
All persons	100	24.2	21.3	29.3	20.4	2.4	2.4
11-19 years	100	6.4	17.9	33.0	36.5	4.0	2.2
20-39 years	100	18.5	30.2	32.0	1.34	2.5	3.4
40 years and over	100	55.3	17.4	21.5	4.1	0.0	1.7
Males	100	18.8	23.4	25.7	24.3	3.2	4.6
11-19 years	100	4.3	16.1	25.9	44.1	5.3	4.3
20-39 years	100	12.5	30.4	32.2	14.2	3.5	7.1
40 years and over	100	43.5	27.6	20.2	5.8	0.0	2.9
Females	100	30.3	19.0	33.3	15.9	1.5	0.0
11-19 years	100	8.8	20.0	41.2	27.5	2.5	0.0
21-39 years	100	23.8	30.2	31.7	12.7	1.6	0.0
40 years and over	100	71.4	3.8	23.0	1.8	0.0	0.0

As would be expected the amount of schooling varies with the age group. Of the 11-19-year-olds 43 per cent have gone through the 6th grade or beyond, one-third (33%) have reached the 4th or 5th grades, and one-fourth (24%) have had only 1 to 3 years of schooling or none at all. In the next age group, 20 to 39 years of

CHART 1. Highest Grade in School Attained by Persons 11 Years of Age and Over; by Age Groups and Sex.



age, the percentage reaching the 6th grade has dropped to one-fifth (19%) and those with only 1-3 years or none has increased to nearly half of the group (48.7%). In the oldest group, 40 years of age and over, only 6 per cent have reached the 6th grade and 73 per cent have had only one to three years or none; over half (55%) have had no schooling at all. Of special significance is the large proportion of youth and young adults, 20 to 39 years of age, that have had little or no schooling. These are the ones for whom schooling should still be provided by some means.

The females have a poorer record of schooling than the males. One-third of all males (32%) have completed 6 years or more of school as compared with only 17 per cent of females that have done so. At the other end of the scale 19 per cent of males have had no schooling at all, as compared with 30 per cent of females that have had none. The bar at the bottom of the chart shows that all but 2 per cent of women 40 years of age and over fall below the 6th grade level and nearly three-fourths (71%) have had no schooling at all.

Ability to Read. When the families were interviewed they were asked not only regarding the grade in school completed by each individual but also whether the person could read. Completion of third or fourth grade did not assure ability to read. Only if a person had completed the sixth grade or above was the reply to this question practically always, "yes," though some persons with little or no schooling had learned to read. According to this testimony nearly one-third (31%) of all persons eight years of age and older cannot read, 26 per cent of males, 37 per cent of females. (Table 5.)

TABLE 5. PERCENTAGE OF PERSONS 8 YEARS OF AGE AND OVER THAT CANNOT READ

Age	All	Male	Females
All persons	30.8	25.5	37.0
8-9	36.0	34.8	37.0
10-15	8.7	6.3	10.2
16-20	20.1	17.4	25.0
21-39	25.9	23.6	27.9
40-59	32.5	24.0	45.5
60 and over	91.0	86.4	95.5

Illiteracy, as would be expected, varies greatly with the age group. Of the 8 to 9-year-olds, over one-third are unable to read (36%). In the 10 to 15 age-group, illiteracy drops to 8.7 per cent, the lowest for any age category. From there on it rises steadily with age: 20 per cent for teen-agers of 16 to 20 years; 26 per cent for young adults 21 to 39 years; 33 per cent for those 40 to 59 years; and 91 per cent for those 60 years of age and over. The same pattern is evident for both sexes but the percentage of females unable to read is higher at all ages than for males, especially in the two oldest groups. In the ages 40 to 59, 24 per cent of the men are illiterate, 46 per cent of the women; and of those 60 years of age or more 86 per cent of the men and 96 per cent of the women belong in this group. Again it should be stressed that at least the 20 per cent of teen-agers and the 26 per cent of young adults that are illiterate should still be taught to read.

It should be remembered that this record of literacy is based on the word of the persons interviewed and, poor as it is, undoubtedly presents a more favorable picture than would be found if a test to read simple material or write a brief note were applied.

Occupation.

The father is the chief bread-winner in 90 per cent of the families. In 5, it is a son, in 3 the mother, and in 2 a daughter or grand-daughter. The chief occupation of three-fourths (74%) of the bread-winners is in farming. One-third of the families (33%) own their own farms, nearly one-fifth (19%) work land on shares, and another fifth (22%) work as farm laborers. In eleven of the families the chief bread-winner's main occupation is outside the area. Four work in a factory, two each as clerk and carpenter, the others as chofer, assistant plumber and hospital worker. Some of these also have a little land on which they can raise some produce. For 15 of the families the chief source of income is relief or pension; three are receiving veteran's pensions and 12 are receiving aid from Public Welfare.

Land Available for Use and Ownership. To say that three-fourths of the families earn a living by farming does not mean that the farms are large enough to provide an adequate income. The large majority of holdings are very small. Nearly two-thirds (60%) are less than 10 acres in size, and nearly half (42%) are less than six. Indeed, 18 per cent consist of less than one acre, over half of these of less than one-eighth of an acre. These are obviously only plots around the house. Only 40 per cent consist of 10 acres or more; 21 consist of 10-19 acres and 19 of 20 acres or more. Only 4 families have as much as 40 acres. The chief agricultural crop is tobacco. (Figure 2) But most families also raise *viandas** as food for the family and as feed for chickens and pigs. Some families also sell part of the viandas. The poor roads and lack of transportation facilities prevent others from doing so.

Less than half the families (40%) own both the house and land which they occupy. A small proportion (14%) either rent the land or house or both or they work land on shares. The remainder or nearly half (46%) have either house or land gratis; 27 per cent own the house but have use of the land gratis and 19 per cent use both house and land free of cost.

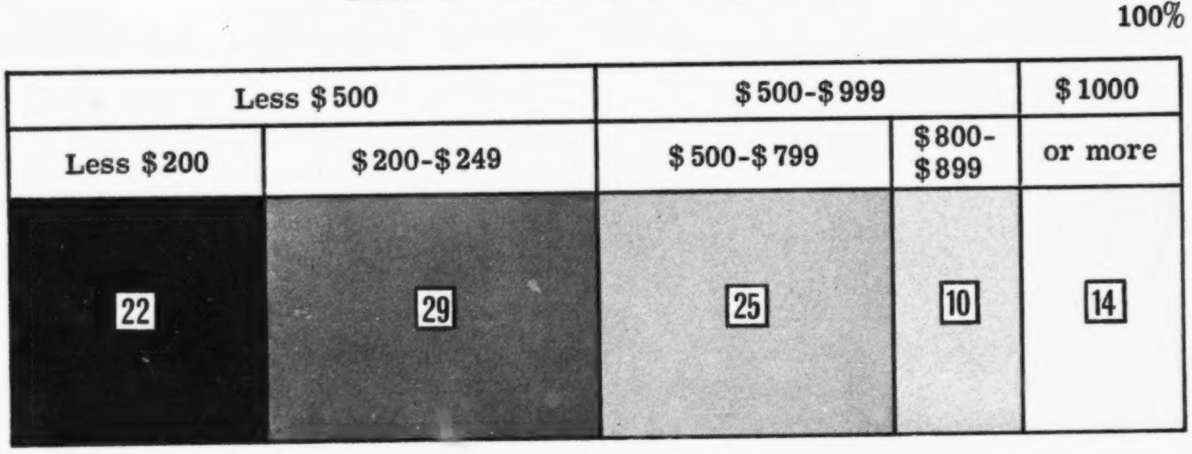
TABLE 6. ANNUAL INCOME FOR 100 FAMILIES

	No. and %	Average
All families	100	$610 ($566)*
Less $500	51	
Less $200	22	$105
$200-499	29	$300
$500-$799	25	$617
$800-$999	10	$925
$1,000 and over	14	$1,731
$1,000-$1,499	4	
$1,500-$1,999	4	
$2,000-$2,999	5	
$3,000 and over ($4,900)	1	

**Omitting one family for out of line with income of $4,900, the average for 99 families is $566.*

**A term applied to starchy root vegetables and fruits such as breadfruit, plantain, and green bananas.*

CHART 2. Annual Income of 100 Families.



Income

The annual money income as computed for these 100 families includes the total received from all sources during the preceding year. (Table 6, Chart 2). In the majority of families it came from the father's earning only, but in some cases the mother or son also contributed. The incomes are generally low. Over half (51%) of all families had incomes below $500 during the preceding year and over one-fifth (22%) had less than $200. One-fourth (25%) ranged between $500 and $799, and 10 between $800 and $999. Only 14 families had incomes of $1,000 or more; for six of these it was $2,000 or over. The average income for all families was $610, but if one family far out of line of the others with an income of $4,900 is excluded, the average is only $566. But for over half the families the average was much larger; 22 families averaged only $105 a year and 29 families only $300.

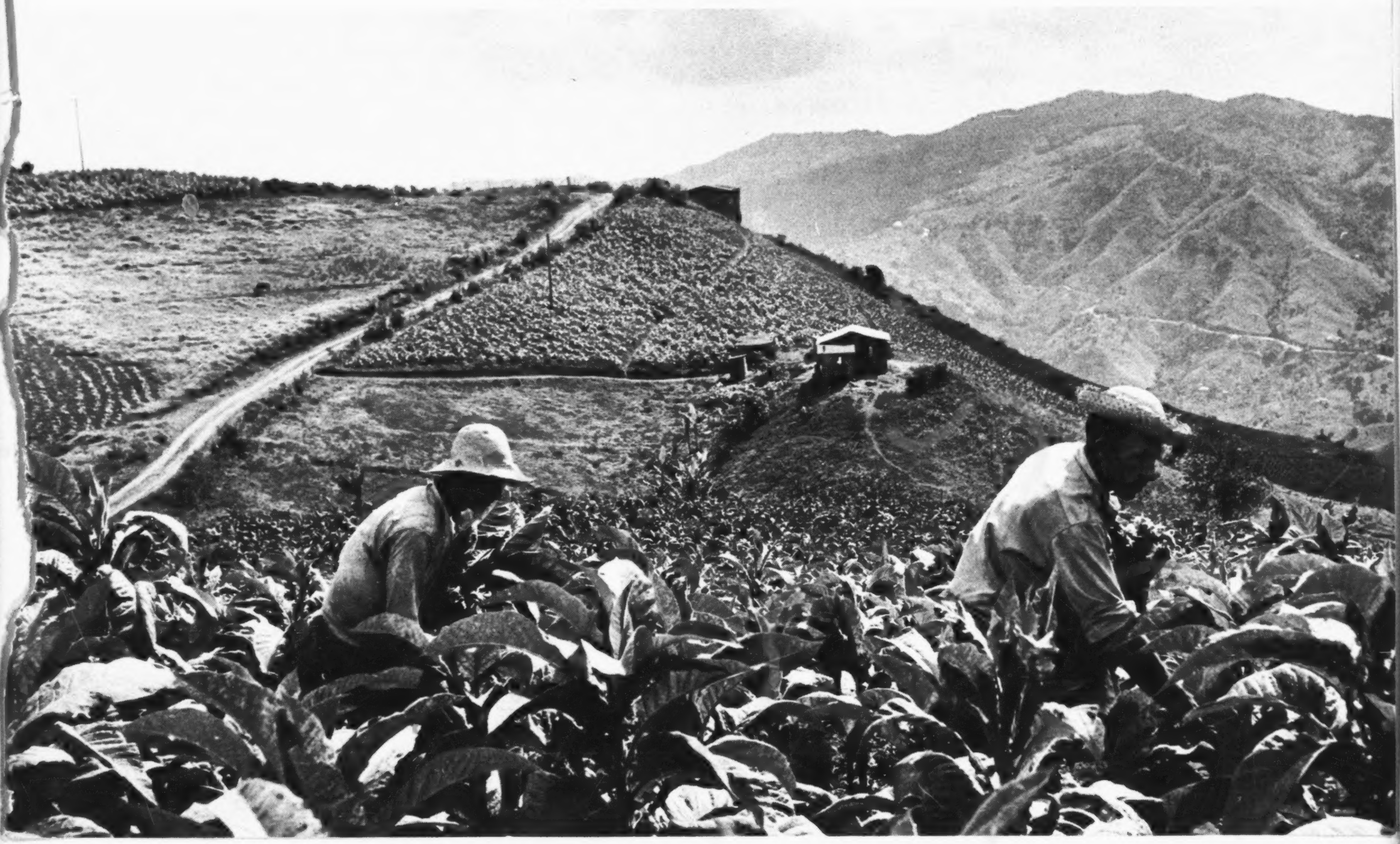
The adequacy of a family income is, of course, determined by the number of persons for which it must provide. For over one-third of the families (36%) it is less than $50 per person; for over one-fourth (28%) it is between $50 and $99, and for 15 families, from $100 to $149. Of the remaining 21 families, five average $150 to $200, ten $200-$299, and six, $300 or more. At least two-thirds of the families (64%) that have less than $100 per person per year must be considered as totally inadequate to meet even a minimum standard of living.

Summary

1. Interviews were obtained for 100 families in the area chosen for the study. These families included 728 individuals, making an average of 7.28 per family.
2. Nearly two-thirds of the families (64%) consisted of 6 or more members, 28 per cent of them of 10 or over. Nearly half of the individuals (47%) were living in families of 10 or more.
3. Over half (55%) of all persons are under 16 years of age; 27 per cent are 16 to 39 years; and 18 per cent are 40 years of age or older. Nearly two-thirds (62%) are in the group commonly termed "dependents," that is, persons under 16 and 60 years of age and over.

4. The educational status is low.
   a. 75 per cent of all persons 11 year of age or more have had less than 6 years of schooling; 24 per cent have had none and 21 per cent have had only 1 to 3 years. This makes 46 per cent that have had little or no schooling.
   b. Thirty-one per cent of persons 11 years of age and over cannot read; 26 per cent of males, 37 per cent of females. Of those 40 years of age and over, 60 per cent cannot read, (males 55%, females 82%).
5. The chief occupation of 74 per cent of the bread-winners is in farming; 33 per cent own their farm, 19 per cent rent or work land on shares, and 22 per cent are farm laborers. Of the remainder, 11 per cent work at various occupations, and 15 per cent live on relief or pension.
6. Land holdings are small; 60 per cent are less than 10 acres, 40 per cent even less than six. One-fifth (21%) are 10 to 19 acres, and only 19 per cent are 20 acres or more.
7. Only 40 per cent of families own both the house and land which they occupy; 14 per cent rent or work land on shares; 46 per cent are living gratis on the land of another; 27 per cent own their house, 19 per cent use both house and land gratis.
8. The incomes are generally low. For over half of the families (51%) it was less than $500 for the previous year; for 22 per cent it was less than $200. One-third (35%) had from $500 to $999, and only 14 per cent had $1,000 or over. The average income for the 100 families was only $610.

Figure 2—A small tobacco farm.



HOME PRODUCTION OF FOODS

Since most of these families had some land available, it might be expected that they could raise a goodly part of their own food. This was true, however, to only a limited extent.

Viandas. The food-stuff most commonly grown is viandas. Over three-fourths of the families (77%) raise some. A few confine their plantings to one or two kinds (14%), but over one-third raise three or four kinds (38%) and one-fourth (25%) may have as many as five or more varieties. The three most popular viandas are green banana, green plantain, and white sweet potato, which are grown by 59, 57, and 47 per cent of the families, respectively. Breadfruit is also available in season to 57 per cent of the families. Malanga, yuca (cassava), ñame (yam), and apio (celery root), are also grown by from one-fourth to one-tenth of the families. No families were growing yellow sweet potato (batata mameya).

Vegetables. Gardens, as such, practically did not exist. Only six families had some vegetables growing. Three had peppers; three, tomatoes; two, pumpkin; two, cabbage; two, chayote; and one each had green beans, corn and eggplant. But 94 families had no vegetables other than viandas and 23 families, as has been seen, did not have these. Of the 94 families that had no garden, 75 said they had space for one. The reasons given for not having a garden included: lack of seeds or not knowing how to secure them; no one able to work the garden; lack of means of protection from dogs and other animals; and lack of interest in having one or lack of the belief that a garden was of any importance.

Fruit Trees. A list of 19 fruits grown in Puerto Rico was checked with the families to find which ones were available to them in season. The ones to which the majority have access are oranges, bananas, guavas, mangos, and grapefruit. Some families have them on their own land but many get them from the neighbors or use ones growing wild along the road or in other places available to all. This applies especially to oranges and guavas.

Cows. At the time of the interview more than half of the families (58%) kept one or more cows. The total number of cows for all families was 121. Only 71 of these, however, were giving milk and their milk yield was very small. Twenty-seven of them (38%) were averaging less than two liters daily and the same proportion (38%) only 2 to 2½ liters. Only 17 cows (24%) were yielding as much as three or more liters daily. Since an average milk cow with reasonably good feed and care will easily produce from 8 to 10 liters of milk daily, it is apparent that the cows in this area are either of a poor breed or they are not receiving adequate feed and care. Breed is probably the prominent factor.

Goats. Sixteen of the families kept goats; 7 had only one, but 3 families had two, 3 had three, and 3 had four or more. All goats were native breed and were not kept as milk goats. Of the 84 families that did not have goats, 40 said they would like to have them. None thought of them as a source of milk. They were desired either for meat, or as a woman expressed it, because a goat was so "simpática."

Chickens and Eggs. All but 8 of the families kept some hens, but for 45 families the flocks consisted of less than 10 fowl and for 13 of them of less than five. Nearly one-fourth of the families (23), however, had 10 to 19 hens and another fourth (24) had 20 or more. With proper care and feeding these flocks should produce enough eggs for the family to eat and the larger ones even a few to sell. The eggs produced, however, were few per hen. Of the 92 flocks, 14 were producing no eggs and 66 flocks were averaging only two eggs a week or less. Only 12 flocks (13%) were averaging three or more eggs per hen per week. As in the case of milk the poor yield is probably due to a combination of poor breed of hens and lack of proper feeding. Breed is doubtless the chief factor. Of the 78 families having eggs, the majority (57) keep them for the family to eat but 16 families sell some and five sell all of the eggs produced.

Pigs. In small holdings such as most of these families have, keeping of pigs might be an easy method of supplying both meat and lard for the family. Out of the 100 families only 63 keep one or more pigs; 45 families keep one, 12 have two, and 6 have three or more. During the previous year 46 families had killed pigs for food: 40 had killed one, the other six two or three. The meat obtained was all used at home by 32 families, but 14 families sold some or all of it. Only 30 of the 46 families obtained lard. Ten of these had 2 to 4 pounds, 12 had 5 to 7 pounds, and 8 somewhat larger amounts. This lard was all used at home by 26 families, the other four sold or gave away some of their supply.

Rabbits. Rabbits have been shown to be one of the cheapest sources of lean meat. Only two of the 100 families visited, however, had rabbits. Of those that did not have them only 40 said that they would like to have some. The reasons for not wanting them were varied. Some had no place to keep them, some considered them as rodents on a par with rats, some claimed they destroyed crops, and some just weren't interested in them.

Summary.

At the time of the interview the food produced for home consumption contributed less than it should to the diets of the families.

1. The main food crop was viandas: 77 families raised one or more kinds. The chief ones grown were bananas, plantain, yautía, and white sweet potato.
2. Only 6 families had gardens. Of the 94 families that had no garden 75 had space for one.
3. A little over half of the families (58%) kept cows, most of them (42) only one. Only 71 of the 121 cows were giving milk. Three-fourths of the cows gave only about 2 quarts of milk a day or less.
4. Most families kept some hens, but over half of the flocks (53%) consisted of less than 10 hens: 87 per cent of the hens averaged only one to two eggs a week or none.
5. Sixty-three families kept pigs, 45 of them had only one. Forty-six families had killed one or more pigs during the preceding year and 6 had killed two or more. Most of the meat was used by the family.
6. Only 2 families kept rabbits. 40 families would like to have them.
7. Sixteen families had goats, but all were native breed and did not produce milk. 40 families would like to have them.

DIETS OF THE FAMILIES

Information on the diet of each of the families was obtained through interviews with the house-wife. She was first asked to describe the meals provided the family during the preceding 24 hours and the amounts of the different foods used in preparing them. Since the meals were very simple, the house-wife could readily give the quantities used, as: one pound of beans, 3 pounds of rice, 12 plantain, etc. In addition detailed questions were asked concerning the frequency with which the family used each of the major food-stuffs and the quantities used during the past two weeks. From these two approaches, together with information obtained about home production of foods, a good picture of the usual diets of the families was obtained. For a few items—rice, beans, milk, sugar, fat, meat—quantitative calculations of the amounts used could be made.

Meals on the Day of the Interview

On the day of the interview *breakfasts* for nearly three-fourths of the families (70%) consisted of coffee only. (Chart 3) For 15 families it was black coffee. The rest had "café con leche" though the amount of milk it contained varied. About one-fourth of the families (23%) had some carbohydrate food such as cereal or crackers with their coffee, and 7 had some protein such as cheese or eggs. Thus breakfast in the large proportion of families contributed little of essential nutrients.

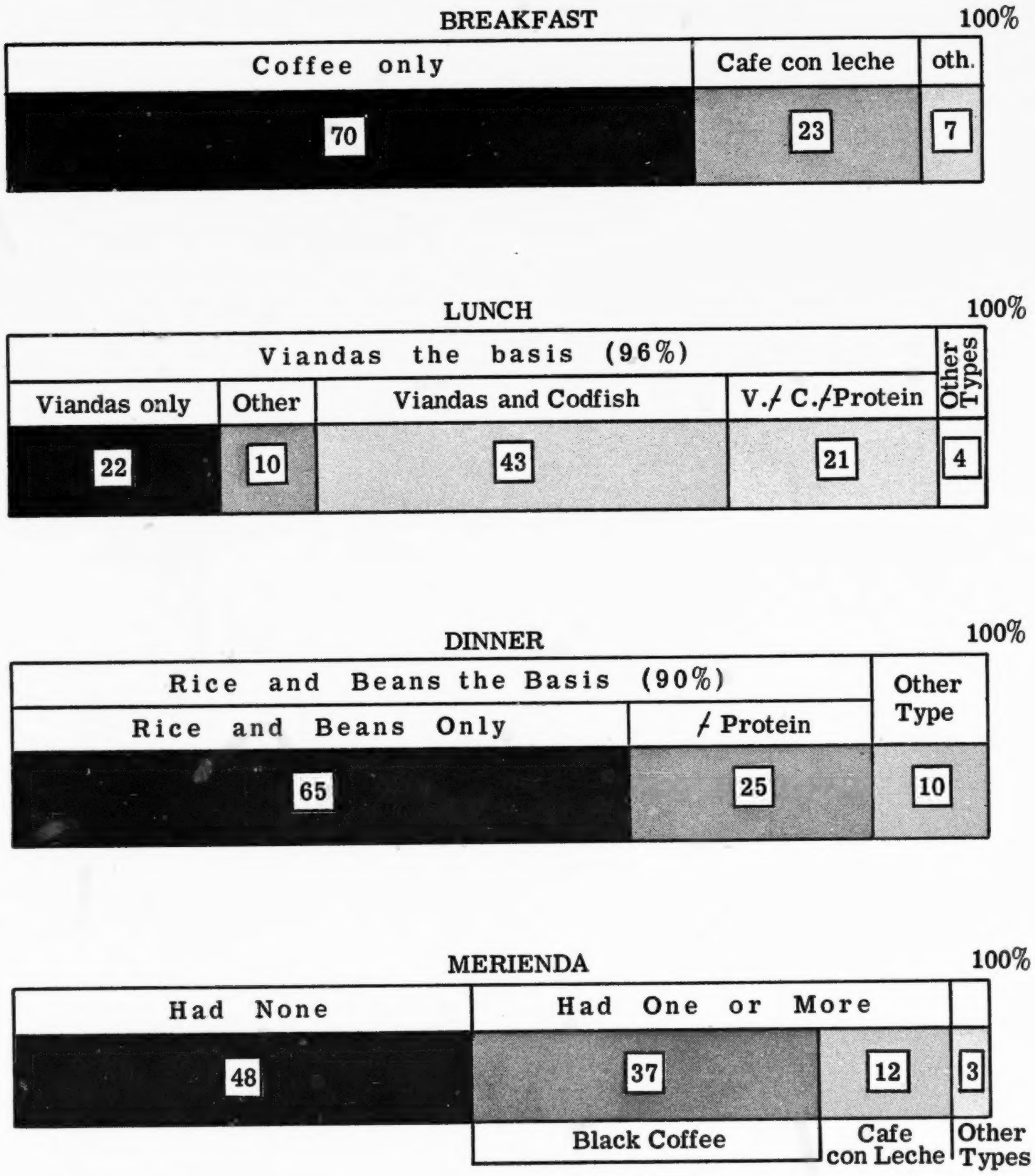
The *lunches* of 96 families were basically "viandas," with or without additions. Of these 22 had viandas only; 43 had viandas and codfish; 21 had viandas with codfish and some other food such as rice, rice and beans, or milk, and 10 had viandas without codfish, but some other additional food. Only 4 of the families had no viandas. Instead they had rice and beans, or rice with codfish or sausage.

The *suppers* of 90 of the families were based on rice and beans. Nearly two-thirds of them had only these foods, or in a few cases, with some carbohydrate (65%). One-fourth of the families (25%) had some protein in addition to the rice and beans—pig's feet, beef, sardines, eggs, chicken, ham, or milk—and 6% of these also had potatoes or viandas. The suppers of 10 families did not follow the rice and beans pattern. These consisted of rice or viandas with some protein (5); soup made of potatoes with a little ham or codfish for flavor and noodles (3); or bean soup only (1). One family had only chocolate for the evening meal.

In addition to the three main meals 52 families had *meriendas,* 24 in the afternoon, 12 in the evening, one in the morning; and 15 two or more times during the day, usually in the afternoon and evening. The meriendas of 49 families consisted of coffee only, either black (12%) or with milk (37%); the three others had milk, chocolate, and kresto.

From this picture of the day's meals it is evident that the diets of these families conform to what has long been known as the typical rural diet, namely, one consisting predominately of rice and beans, viandas, codfish, and coffee, with lard and sugar for seasoning and with small but variable amounts of other foods.

CHART 3. Types of Meals Families had on the Day of the Interview.



This is also borne out by the tally of the foods that appeared in the meals of the families on the day of the interview. (Table 7). Rice appeared in the day's meals of 91 families, beans in 84, codfish in 69, cafe con leche in 80, black coffee in 24, and bananas, yautıa and plantain in about 40. Other foods were present in few of the day's meals. Vegetables other than viandas were found in only four and fruits in none. Since, as shown later, it is not the custom to eat fruits at meals, their absence from the list does not necessarily mean that some members of the family did not have them. Fat and sugar were not listed separately as they are used solely for seasoning but were doubtless used by all families.

TABLE 7. FOODS USED BY 100 FAMILIES ON THE DAY OF THE INTERVIEW

Food	Families No.	Food	Families No.	Food	Families No.
Viandas		**Legumes**		chicken	6
Banana	42	beans	82	cheese	6
yautia	42	chick peas	1	ham	5
plantain	40	pigeon peas	1	corned beef	1
white sweet potato	19			beef	3
potatoes	11	**Cereal products**		sausage	2
malanga	5	rice	91	pork	1
yuca	3	crackers	19	sardines	1
apio	3	corn meal	10		
name	1	noodles	5	**Others**	
ripe plantain	1	bread	4	Café con leche	80
Vegetables				Milk alone	24
calabaza	1	**Protein Foods**		Black coffee	24
green beans	1	cofdish	69	Lard	17
cabbage	1	eggs	12	Salt pork	2
peas	1	pigs feet	9	Fruits	None

Use of Specific Foods

Although the record of one day's meals as outlined above gives a fair picture of the usual diets of the group, a more detailed appraisal was obtained from the record obtained of the use of specific foods.

Milk

In view of the importance of milk in nutrition, effort was made to determine as accurately as possible the total quantity used by each family and the daily average per family member. A record was obtained from the housewife of the total amount of milk of various kinds that was used during the preceding week. This was reported in quarts of fluid milk, small or large cans of evaporated milk, and cans of dry milk either whole or skim in a variety of sizes. These quantities were all converted to their equivalent in fluid milk and the average ounces per family and per person daily was then calculated. The number of children having lunches at school was also ascertained and 8 ounces for each child was added to the family's total. A second calculation was then made for the total for the family when milk at school was included.

Fresh milk is the kind most used. Sixty-one of the 100 families use it and 42 of them use no other kind. The rest supplement it with dry skim (14), evaporated (3), or dry whole milk (2). Twenty families use chiefly or entirely the Federally donated dry skim milk. The remainder use evaporated (6), whole dried milk (5), or skim milk (3); five families have no milk at all.

Amount of Milk Per Person from the Home Supply. One pint of milk, or 16 ounces, for each person daily is commonly regarded as a minimum over-all average for a family. More than this is needed when the family includes a pregnant or nursing woman or adolescent children. By this minimum standard only one-third of Doña Elena families (33) averaged a pint of milk per person daily from their home supply, though 19 others had about three-fourths of this amount or 12 to 15 ounces. (Table 8A). Nearly half of the families (48), however, fell well below the 12 ounce minimum; 26 had 8 to 11 ounces, and 22 less than 8 ounces, or one cup, per person.

TABLE 8. AVERAGE AMOUNTS OF MILK PER PERSON PER DAY;
A. FROM HOME SUPPLY, AND B. PLUS THAT FROM THE SCHOOL LUNCH

Ounces Per Person	A. Home Supply No. & %	B. Plus that from other sources.* No. & %
All families	100	100
Less 8 ounces	22	17
0-3	12	9
4-7	10	8
8 less 16	45	47
8-11	26	19
12-15	19	28
16 and over	33	36
16-23	17	20
24-27	8	6
28-31	5	6
32 and over	3	4

**Largely school lunch milk. Amount would actually be less due to absences from school.*

Milk Supplied by the School Lunch. The milk received by children at school made notable additions to the total for the family. Of the 100 families 59 had one or more children receiving lunches at school. The majority of them (43) had from one to three children taking lunch but 9 families had four, two had 6, and one had 8 children having school lunches. Since each child receives one eight-ounce cup of milk in the lunch, the extra milk available to these 59 families amounts to 770 cups, or 192.5 quarts weekly, or an average of 3.3 quarts per family. For the 16 families having 4 or more children in school it amounts to an additional quart or more of milk a day or 20 quarts or more a week. This estimate is, however, based on the total milk allocated. Unfortunately school attendance was very poor, as will be shown later in this report; hence the actual amounts received are significantly less than those given in the table.

Total Milk Available. When the milk from school lunches is added to the home supply, the average intake is somewhat better. (Table 8B.) Now 36 per cent of the families have a pint or more per person, 47 per cent have from 8 to 15 ounces, and only 17 per cent less one cup or 8 ounces daily. This is a more favorable record than that found in the 1946 study, in which over three-fourths (79.8%) of rural families averaged less than one pint of milk per person daily as compared with two-thirds (67%) that did in the present study. The Federal milk supplied to many Doña Elena families accounts in part for their better record. As already indicated the amount contributed by the lunch is probably over-estimated due to the poor school attendance. Hence the picture is in reality less favorable than this table indicates.

It must be recognized, too, that this milk is not evenly distributed to family members. The children from the 59 families who are in school will fortunately get at least a cup and probably some part of the home supply. Younger children at home and out-of-school adolescents and pregnant and nursing mothers are probably receiving much too little even in the families averaging a pint or more per individual. Poor as this milk record is, however, it is the most favorable aspect of the dietaries. All families want milk and will gladly use more if they can get it.

Protein Foods.

The small extent to which high quality protein foods are used is evident in Table 9A. Codfish is the only food used by nearly all families. Seventy-nine families use it daily and 14 have it one to three times a week; only seven families practically do not use it at all. Eggs come second with 35 families having them practically daily and 13 several times a week. Nearly half of the families (47%), however, almost never use eggs. Cooking ham is used daily by 37 families and often by 19; but 44 families rarely or never have it. Since this ham is used mainly as flavoring for their "sofrito" (seasoning sauce) it would not in any case add significantly to the protein of the diet. About one-fourth of the families (26%) were using American cheese almost daily. This is explained by the fact that cheese was one of the surplus products that was being distributed at the time of the interview to needy families by the Food Distribution Division of the United States Department of Agriculture. Since a month's allowance was given at one time it was usually eaten regularly while it lasted. These four foods—codfish, eggs, cooking ham, and cheese—are the only ones that were used as often as 4 to 5 times a week by many of the families. Other well-liked protein foods have some place in the diets of a few families. Thirty-nine families have beef about once, or in a few cases twice a week, and 19 have chicken, 14 have sausage, 16 have pork, and 10 have sardines as often as weekly. But from 61 to 90 per cent of the families almost never have any of these foods. Indeed, codfish and eggs are the only ones that have a significant place in the dietaries of these families.

Viandas (Starchy Vegetables and Fruits)

Of the 12 viandas—or starchy vegetables and fruits—commonly used in the Island, five have a significant place in the diets. (Table 9B.) The most popular of these is the green banana which 61 families use practically daily and 21 others several times a week. Potatoes come next with 53 families using them daily. Potatoes, however, do not constitute a major part of the diet as do other viandas but are commonly used in smaller quantities in the beans, soup, or other dishes. They are, however, well-liked, but since they are not grown but must be bought the quantity used is limited. Green plantain and yautía are used either daily or several times a week by about two-thirds of the families (68 and 62%) and white sweet potato by nearly one-half (45%). In short, four viandas—green bananas, green plantain, yautía, and white sweet potato—form the basis of the large proportion of the diets. Others are used only irregularly by a small proportion of families.

TABLE 9. NUMBER OF FAMILIES USING FOUR TYPES OF FOODS WITH SPECIFIED FREQUENCY

Food	Daily or 4-5 times/wk.	2-3 times/wk.	Once a week	Practically Never or
A. PROTEIN FOODS				
Codfish	79	11	3	7
Eggs	35	13	5	47
Cooking ham	37	10	9	44
Cheese, imported	11	6	9	74
Beef	—	12	27	61
Chicken	—	5	14	81
Sausage	—	4	10	86
Pork	—	7	9	84
Sardines	—	4	6	90
Mortadella	—	3	3	94
Salmon	—	—	2	98
Cheese, native	—	1	1	98
Goat, ham, rabbit, Luncheon meat Lobster, shrimp, crabs	—	—	—	100
B. VIANDAS				
Banana (guineo)	61	21	13	5
Potato	53	18	11	18
Plantain (plátano verde)	50	18	9	23
Yautía	39	23	7	31
White sweet potato	28	17	13	42
Breadfruit (panapén)	16	9	11	64
Malanga	12	13	12	63
Casava (yuca)	11	5	7	77
Ripe plantain	6	8	11	75
Name	4	3	7	86
Celery root (apio)	3	10	5	82
Yellow sweet potato	0	0	2	98
C. CEREALS				
Rice	91	2	7	0
Crackers	21	12	8	59
Cornmeal	12	6	27	55
Bread	9	17	8	66
Pastes (macaroni, Spaghetti, noodles)	7	8	5	80
Cream of wheat	2	1	2	95
Ready to eat cereals	—	—	—	100
D. Legumes				
Red kidney	63	32	3	2
White beans	13	7	7	73
Cow peas	—	1	6	93
Chick peas	—	6	12	82
Lima beans	—	—	6	94
Dry peas	—	2	6	92
Pigeon peas, fresh	—	7	5	88
Pigeon peas, dry	—	—	5	95

As seen in the preceding section the noon meal of 96 of the families consisted largely or entirely of viandas. Usually two or more kinds are cooked together with a piece of codfish.

Vegetables Other than Viandas

It was noted in a preceding section that vegetables other than viandas appeared in the diets of only four families on the day of the interview. The record of vegetables used in the week's meals gives further evidence that vegetables, other than viandas, play almost no part in the diets except for those used in small amounts for seasoning. Eight families had no vegetables at all, 56 had only onions or tomato sauce, or both, and 26 had one or both of these plus some other vegetable, as cooking tomato, eggplant, pimiento, chayote, cabbage, and calabaza. These are used in small amounts in the sofrito (cooking tomato, pimiento) ; as thickening for the beans (pumpkin) ; or in soups or stews. The number of families having each of 9 vegetables was: onions, 82; tomato sauce, 73; both onions and tomato sauce, 64; calabaza, 7; cooking tomatoes, 13; pimiento, 9; eggplant, 5; cabbage, 4; chayote 2.

Contributions to the Diets of Onions and Tomato Sauce.

Since onions and tomato sauce were the only vegetable products used by most families calculations were made to determine whether they contributed any significant amounts of any nutrients in the amounts used. Over one-third of the families (38) used less than a pound of onions a week, nearly half of them (47) had about one pound, and 15 had two pounds or more. For three-fourths of the families (76) this averages less than a half ounce a day for each individual, and for 13 more less than one ounce. Only 11 families had an average of one ounce or more: three of these had about 3, 5, and 8 ounces per person.

Of the 100 families only 19 had used no tomato sauce during the week and 8 had used one can or less. Of the remainder 21 used two or three cans, 27 four or five cans, and 25 had six cans or more or about one can per day. When distributed among family members, it is found that for 80 of the families the tomato sauce used provided less than one ounce per person daily, and for 43 it is less than one-half ounce. The remaining 20 ranged from 1.1 to 2.7 ounces per family member.

Do such small amounts of these flavor vegetables furnish significant amounts of nutrients to the diet? The answer is seen in the following comparison of the amounts of several dietary essentials provided by one ounce each of onions and tomato sauce with the amounts of these nutrients required to meet one-tenth of a day's "allowance." This is used as a basis of comparison since a food is considered a significant source of a nutrient if an average portion supplies at least one-tenth of the day's requirement for it:

	Calcium mg.	Iron mcg.	Vit. A units	Thiamine mcg.	Riboflavin mcg.	Niacin mcg.	Vit. C mg.
1/10 day's "requirement"	80	1200	500	160	160	1500	7
Onions, 1 oz.	9	130	13	9	9	60	2
Tomato sauce, 1 oz.	31	310	535	25	20	500	14

The amounts of these nutrients in one ounce of onions are so minute that they can be disregarded. Since 89 of the families were having even less than one ounce per person, it is clear that onions were contributing only flavor to the diets.

Tomato sauce makes a somewhat better contribution. One ounce meets the one-tenth of the day's requirement for vitamin A. For the 20 families having one ounce or more this would be significant. As it comes from the can this amount is also a good source of vitamin C. When it is cooked for a long time exposed to air, as it is in making sofrito, it is doubtful whether any is left. Since vitamin A is the vitamin most commonly lacking in Puerto Rican diets, even the small amounts obtained by these families is a protective factor. If all of them could have as much tomato sauce as they would like to have, it would materially improve their diets in a number of factors.

TABLE 10. AMOUNTS OF RICE PER PERSON PER DAY AND AVERAGES BY GROUPS

Ounces	No. & %	Average Ounces	Ounces	No. & %	Average Ounces
All families	100	6.7			
Less 2	11	1.75	Eight to Ten	26	8.2
Less 1	5		8 less 9	13	
1 less 2	6		9 less 11	13	
Two to four	14	3.8	Eleven and over	10	13.0
2 less 3	2		11 less 12	3	
3 less 4	6		12 less 13	2	
4 less 5	6		13 less 14	2	
			14 less 15	0	
Five to seven	39	6.3	15 less 16	1	
			16 and over	2	
5 less 6	12				
6 less 7	17				
7 less 8	10 27				

Cereals and Legumes.

Rice is the only cereal used by all families (Table 9C). It is a daily article of diet in 91 families, and it is safe to assume that all 9 others would have it daily except that it must be purchased, while viandas can be grown on their own land or secured from neighbors without cost. Soda crackers are used daily by one-fifth (21%) of the families and frequently by an equal number (20%). These are usually purchased in 5-pound cans and are used in the place of bread by families that can afford them. Corn meal, at the time of the interview, was being used daily or several times a week by nearly half the families (45%). For some of them it was obtained as part of their allotment of foods donated by the Food Distribution Division of the United States Department of Agriculture. Bread is not a common article of diet; only nine families have it daily. These are doubtless ones who live near the road or stores where it can be secured daily. Others have it occasionally (25%), but two-thirds of the families (66%) practically never have bread. For most of these, distance from a source of supply could alone account for the failure to use this well-liked staple food, but its cost would also prohibit many of them from buying it even if it were available.

Amounts of Rice Per Capita. The average per capita consumption of rice for all families is 6.7 ounces per day. (Table 10.) This is the same as was found for all Puerto Rican families in the 1949 study. About one-fourth of the families (27%) had close to this average, or from 6 to 7 ounces, and over half (52%) had from 5 to 8 ounces. One-fourth (25%), however, had only 4 ounces or less, 11 of them less than 2 ounces. On the upper side of the average are 23 families that averaged 9 ounces or more per person. That over-all averages may be misleading is shown by the breakdown for smaller groups. These range from an average of 1.75 ounces for 11 families and 3.8 ounces for 14, to 8.2 ounces for 26 families and 13 for another 10. Three families, moreover, had about one pound of rice daily per person.

Beans. Beans are the usual accompaniment for rice. Rice and beans, as has been seen, formed the basic dish for the evening meal for 90 of the 100 families and for 62 it constituted the whole meal. The favorite type of bean is the red kidney. All but five of the families (95%) have them practically daily. White beans are the only others that have any real place in the diets; 20 families use them frequently. All other legumes are used only occasionally or not at all by 82 to 95 per cent of the families. It is significant that pigeon peas are so lacking since they can be easily grown and used fresh or dried. In families with low incomes such as these but some land on which to grow food, a row of pigeon peas would be one means of improving the diets. Some of the money now spent for beans could be used to purchase more of other essential foods.

Fats, Sugar and Desserts

Fats. Lard is the cooking fat of choice; 98 families use it and 42 use no other fat. Salt pork is used by 54 families, usually in addition to lard. Oil is used by 17 families and butter or oleo by only 3. The total of all fats used is not large for most families when reduced to the per capita basis. (Table 11B.) One-fourth of the families (26) had less than one ounce per person per day and nearly half (45) averaged from one to one and a half ounces. For the remainder the amounts were more liberal; 14 had 2 to 2½ ounces, 11 had 3 to 4, and 4 had 5 or more ounces per person daily. This represents a relatively low fat consumption for most families. In common usage 30 to 35 per cent of the calories from fat is considered a reasonable intake. Assuming the average calorie intake for a family to be 2,000 calories, this would allow some 600 to 700 calories to come from fat. Yet 82 of the families averaged less than 600 calories from fat. In fact nearly two-thirds of them (71) had less than 400 calories from fat and nearly half of them (45%) less than 300 calories. In view of present-day knowledge this low fat intake may be desirable, though for those at the lowest level it is too little for palatability and may be also too low for good nutrition.

Sugar. All families use sugar, chiefly in their coffee. (Table 11B.) It is commonly assumed that the amounts used are large. This is true for only a small proportion of these families. Over half of them (55) averaged less than two ounces per person daily; 9 of these less than one ounce. Of the remainder, 33 averaged 2 to 3 ounces, and 12 had 4 ounces or more. The average yearly sugar consumption in the United States is usually over 100 pounds per capita. This would make a daily average of at least 4.4 ounces. Only 12 Doña Elena families had sugar in amounts to equal or exceed the United States average. As shown later many families would use more sugar if they could afford it.

TABLE 11. AVERAGE AMOUNTS OF FAT AND SUGAR AVAILABLE PER PERSON AND CALORIE EQUIVALENT OF FAT

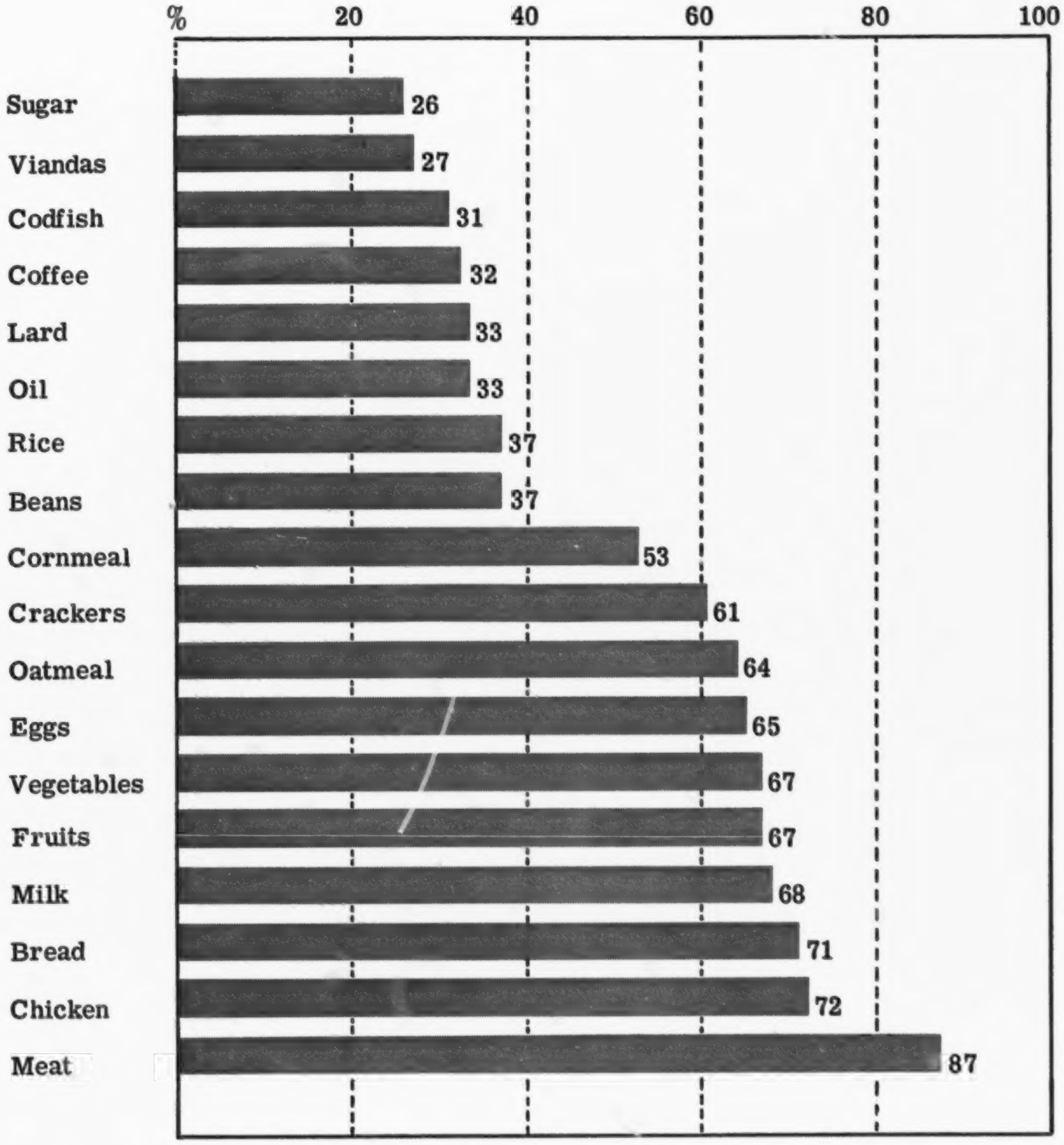
Ounces	A. Fats		B. Sugar
	Calories Equivalent	No. families having	No. Families having
		%	%
All families		100	100
Less 1	Less 256	26	9
One	256	19	22
1½	384	26	24
2'	512	11	14
2½	630	3	9
3	768	8	10
4	1024	3	9
5 or more	1180	4	3
Average/da.	1.5 oz.		1.94
/wk.	10.5 oz.		13.6

Desserts. Sweets other than sugar in coffee play little or no part in the diets. Over half of the families (59) never have desserts of any kind; the other 41 use them only occasionally. The most common ones used are cookies and cake; about one-fourth of the families have them sometimes (cookies 30%, cake 23%). These are all bought products as none of the families bake or even have ovens for doing so. Canned fruits also sometimes serve as desserts for 19 families. Other common desserts such as puddings, pastes, preserves, pie and ice cream are never used by 90 to 96 per cent of the families.

Canned Vegetables and Fruits

Canned vegetables and fruits, other than tomato sauce, are unimportant items in the diets. Eighty-nine families never use any canned vegetables, 64 use no canned fruits and 38 no canned juices. The total times any canned vegetable was listed as used was 17 and these included only five vegetables—peas, green beans, corn, pimiento and mixed. Of the fruits and juices, pear, peach, and fruit salad are the most popular and pears head the list of these. Out of the total of 83 times any canned fruit was listed 59, or 71 per cent, were one of these three favorites and of the 117 mentions of canned juices 60 per cent were also one of these three. This is in agreement with the findings in the "Patterns of Living" study which also showed the same three canned products to be the ones most favored.

CHART 4. Percentages of Families that Say They Need More of Specified Foods.



Foods That the Families Say They Need More of

To ascertain how satisfied the families are with their limited diets, a list of 19 common types of foods was read to the housewife during the interview and she was asked to state for each whether or not the family had all they needed of it. The first seven in the list were the ones of which their diets have been shown to be largely composed—rice, beans, viandas, codfish, lard, sugar, and coffee. Then followed those which were more likely to be inadequate—milk, meat, vegetables, and fruits. It was expected that practically all families would have enough of the seven most common foods. But such was not the case. (Chart 4.) One-fourth of them said they needed more sugar (26%) and viandas (27%); and one-third or a little more needed more codfish (31%), coffee (32%), lard (33%), oil (33%), rice (37%) and beans (37%). Three common cereal products were also needed by over half to two-thirds of the families; corn meal (53%), crackers (61%), and oatmeal (64%). About two-thirds of the families did not have enough eggs (65%), vegetables (67%), fruits (67%), and milk (68%); and nearly three-fourths said they needed more bread (71%), and chicken (72%). Most lacking of all the foods was meat of which 87 per cent had insufficient amounts.

As a further check on the foods that the families desired, the house-wife was asked, "If you had more money to spend for food what would you buy first? What would you buy next?" The replies again showed that meat was most lacking as it was named as first choice by 51 of the house-wives and as the second by 23. The next choice was milk. Indeed, meat or milk were either first or second choice of the families. It is encouraging to find that these nutritionally important foods were the ones most desired by so large a proportion of the families.

Adequacy of the Diets.

Although weighed diets were not obtained a general appraisal of their adequacy can be made from the kinds and quantities of foods used in the meals on the day of the interview and the frequency with which common basic foods were used as reported by the housewife. It has been seen that nearly two-thirds of the families were subsisting almost entirely on a diet of rice, beans, viandas, codfish and coffee with lard and sugar for seasoning. How adequate is such a diet? Its deficiencies are graphically shown in Chart 5. Each bar represents a nutrient. The full length of the bar represents 100 per cent of the "allowance"* for that nutrient. The black portion shows the proportion of the allowance provided by a diet consisting solely of the basic rice, beans, vianda pattern. The blank portions show the lack of the various nutrients. For four of the nutrients—protein, iron, thiamine and niacin—the bars cover two-thirds or more of the allowance and the diet would therefore appear to be fairly close to adequacy in these factors. The protein, however, is largely of vegetable origin; only a small portion—indicated by the black strip at the bottom of the bar—comes from codfish. It is doubtful whether this is sufficient to supply adequate amounts of all essential amino acids. In addition to the probable lack of high quality protein, the diet is markedly deficient in three nutrients; calcium, vitamin A, and riboflavin, and often in vitamin C. The degree of deficiency for vitamin A depends largely on the viandas used. As shown in the chart the addition of 200 grams of green plantain increases significantly the amount of the vitamin. Used in larger amounts as it is by many families, it may meet the full allowance. Other viandas, however, supply little of this factor.

The foods that would make up these deficiencies are shown in the chart. An egg, or a serving of meat, fish, fowl, or milk would supplement the protein. Milk would supply the calcium and riboflavin; a generous portion of any deep yellow or green vegetable such as carrots, greens, pumpkin, or yellow sweet potatoes would supply the vitamin A; and fresh raw fruits such as orange, guava, or almost any other tropical fruit would furnish abundance of vitamin C. Enriched rice alone would

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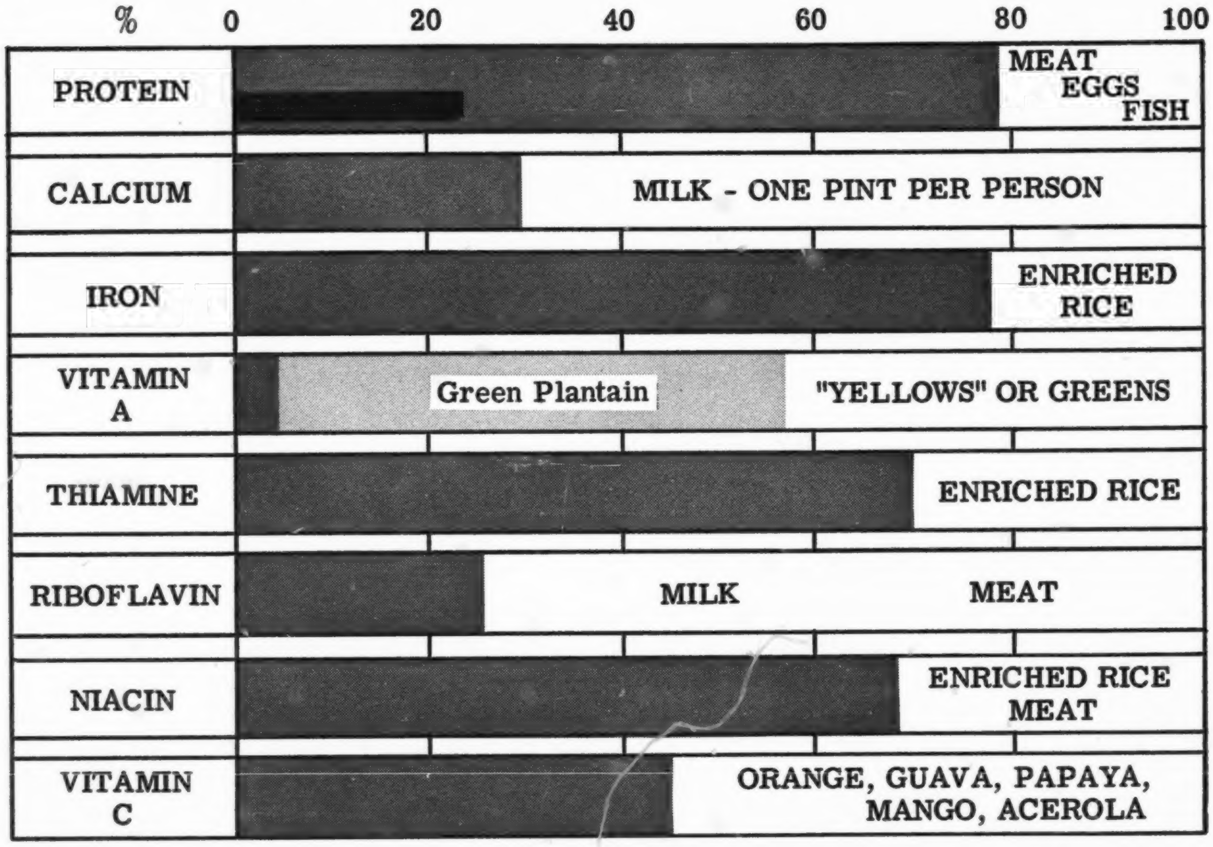
"Allowances" used are based on the Dietary Allowance of the Food and Nutrition Board of The National Research Council. They have been modified somewhat to allow for the smaller average size of Puerto Ricans. They are not to be regarded as actual requirements, but as desirable amounts to provide to insure requirements are met.

CHART 5. Nutrients in Typical Rice, Vianda Diet, and Foods that Will Supplement its Deficiencies.

Each bar across represents a nutrient. The whole bar represents 100 per cent of the recommended allowance for it. The black portion of the bar shows the proportion of the allowance that the rice, beans, vianda diet provides. The blank spaces then represent the deficiencies. Note that the three items most lacking are calcium, vitamin A, and riboflavin. The foods needed to supplement the deficiencies are shown in the blank spaces.



make up any deficiencies in iron, thiamine and niacin. Since all rice sold in Puerto Rico is now enriched with these three factors, the diets should be adequate in them. However, many housewives wash the rice excessively, and thus lose most or all of the enrichment.

It was previously seen that about two-thirds of the families in this area were living on diets of the type shown in the chart, and were therefore doubtless receiving inadequate amounts of the nutrients in which such a diet is deficient. Not all of them, however, had only these foods. Some had a little milk and some had meat or eggs occasionally, but in most cases in inadequate amounts to make up the deficiencies. About one-third of the families had something in addition to the basic group. The adequacy of such diets depends on the kind and amount of the additional food. For the 33 families that averaged a pint of milk or more per person, this added to the basic group, would alone relieve the deficiencies for good quality proteins, calcium, and riboflavin, though it might not provide full amounts desirable for families containing pregnant or lactating women, or a number of adolescent children. Vitamins A and C would still be questionable due to the small use of vegetables and fruits by all families.

Summary:

The diets of about two-thirds of the families are deficient in good quality protein, calcium, riboflavin, and vitamin A, and questionable in respect to vitamin C and total calories. The diets of all families are of questionable adequacy in respect to vitamins A and C and many of them also for calcium and riboflavin.

In terms of foods needed to relieve these deficiencies:

1. At least two-thirds of the families need more milk to supply the calcium and riboflavin and some good quality protein.
2. All families need green and yellow vegetables to supply vitamin A as well as other important factors.
3. All need more fresh raw fruits to insure adequate amounts of vitamin C.
4. More meat and eggs would be desirable for practically all families to supply more high quality protein.
5. One-fourth or more of the families need more of all foods, even the basic rice, beans, viandas, codfish, lard, and sugar.

PHYSICAL STATUS OF CHILDREN

Height and Weight for Age Compared With Standards.

As previously noted the children in the school appeared to be very small for their age. This was borne out by a comparison of their heights with accepted standards. Each child's height for age and weight for age was plotted on physical growth record charts.* These charts show zones of growth in height for children from 4 to 15 years of age, from very short (3 percentile) to very tall (97 percentile) and in weight from very light for age (3 percentile) to heavy (97 percentile). All 95 of the Doña Elena school children fall in the short zones and most of them well below them. (Charts 6 and 7.) The girls are even lower than the boys; 83 per cent of them were classed as very or extremely short as compared with 70 per cent of the boys who were so classed. For weight also practically all children are below the 10th percentile and most of them below percentile 3. The short stature of the children may of course be partly a racial factor since Puerto Ricans in general are shorter than the averages for the United States. But the dietaries low in good quality protein as well as calcium and other nutrients prevalent in this community are doubtless also at least in part responsible for the small size.

Under Weight for Height and Age.

The children were not only short for their ages but the majority were also underweight for height when compared with the "expected" weight for height and age as given in the Baldwin Wood Tables. By this standard only about one-fourth (26%) of the Doña Elena children were of average weight or above (Table 12). Three-fourths were below average (74%). One-third of them (32%) were less

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**Charts used by The Department of Pediatrics California Medical School, adapted from those of Meredith, Iowa Child Welfare Research Center.*

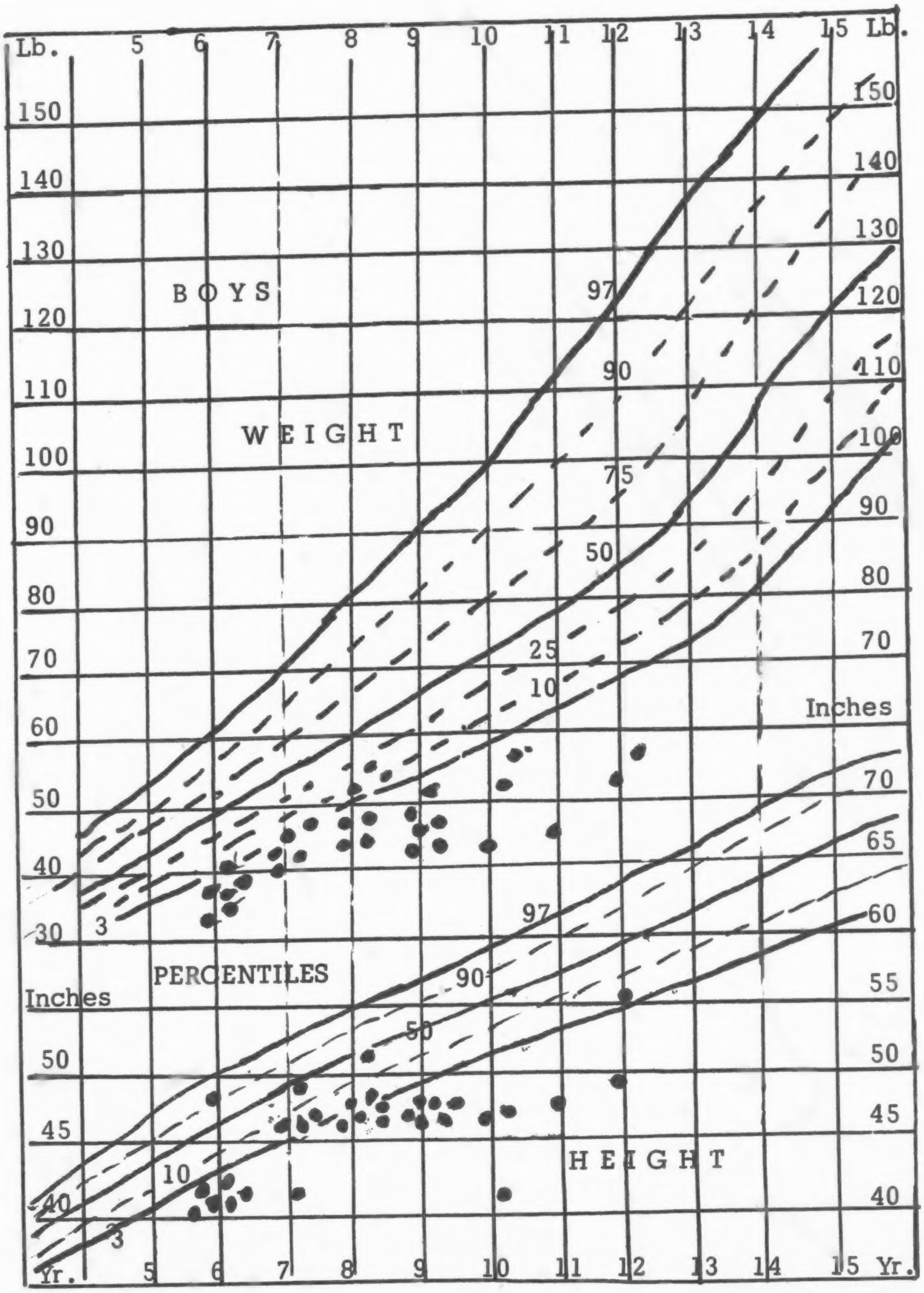


CHART 6. Heights and Weights of Doña Elena Children Plotted on Standard Boys Growth Chart.

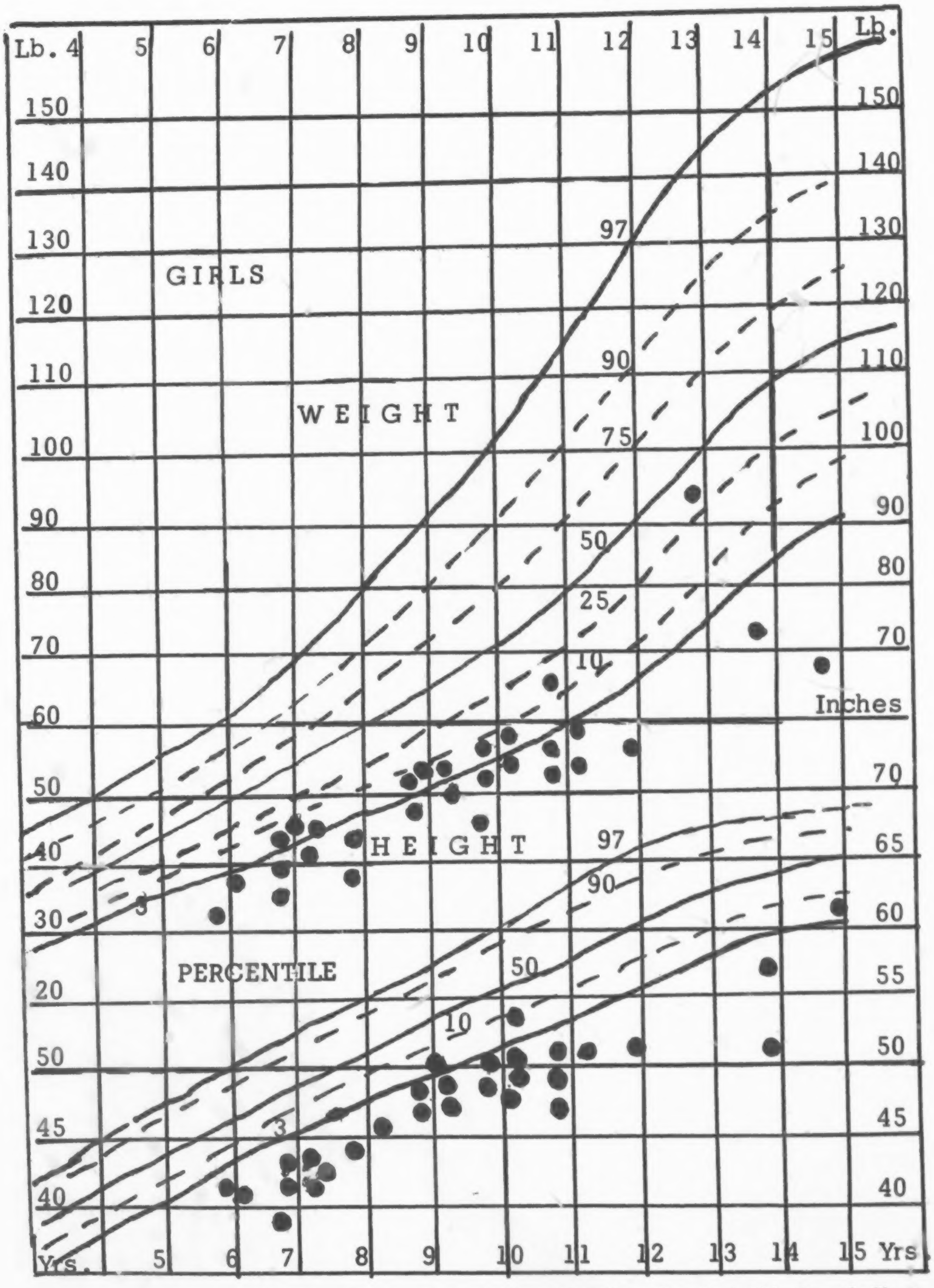


CHART 7. Heights and Weights of Doña Elena Children Plotted on Standard Girls Growth Chart.

than 7 per cent below, but one-fifth (21%) were 7 to 9 per cent, and the same proportion (21%) were 10 per cent or more under the expected weight for height and age. By common usage only this one-fifth that were 10 per cent or more below average would be considered significantly underweight. It has been a common observation however, that children who are considered "good" in respect to the amount of "padding" over their bones are usually well on the upper side of the average. The majority of the children in this group would be considered as no more than fair and at least one-fifth as poor or very poor.

The control children had a higher proportion below average weight than the Doña Elena group: 84 per cent versus 74 per cent were below the average and 36 per cent were 10 per cent or more below as compared with 21 per cent of Doña Elena children in this group.

TABLE 12. PERCENTAGE DEVIATION FROM AVERAGE WEIGHT FOR HEIGHT AND AGE OF DONA ELENA AND CONTROL CHILDREN AT THE BEGINNING, AUGUST 1958

Deviation %	Dona Elena All %	 Boys %	 Girls %	Control All %	 Boys %	 Girls %
Average or above	26.0	31.5	20.0	16.3	12.9	18.9
7 or more	4.8	3.7	4.0	0.6	3.5	0.9
0-6	21.2	27.8	16.0	15.7	9.4	18.0
Below average	74.0	69.0	80.0	83.8	87.2	81.1
1-6	32.0	36.0	28.0	30.0	36.0	25.3
7-9	21.0	20.0	22.0	17.8	15.2	19.8
10 or more	21.0	13.0	30.0	36.0	36.0	36.0
Number of Children	104	54	50	197	86	111

Clinical Findings.

The medical findings cannot be considered as an entirely adequate appraisal of nutritional status for the examinations were made by several physicians who did not have the same background of experience in such methods and whose standards thus differed. Time was also too limited for the examiners to check their findings with each other. The results as given here (Table 13) show the chief indications of nutritional deficiencies found under these conditions. It was somewhat surprising to find a fairly high incidence of slightly enlarged thyroids especially among Doña Elena adults and the control children, over two-thirds of whom had them. This may perhaps be explained by the fact that these people live in the highlands away from the effects of iodine-containing ocean spray and that their food is either grown on their own soil or is rice and beans and a few other foods that came from the states. They may, therefore, be getting less iodine than their bodies require.

One cannot relate other clinical findings directly to specific dietary deficiencies. One can merely say that the conditions observed are ones commonly associated

TABLE 13. CLINICAL FINDINGS FOR DONA ELENA AND CONTROL CHILDREN AND DONA ELENA ADULTS

	Dona Elena Children %	Control Children %	Dona Elena Adults %
Hair, dispigmentation	4	12	3
Glands, somewhat enlarged			
Thyroid	18	39	36
Parotid	21	25	
Seborrhea, nasal	13	24	44
Seborrhea, other	7		3
Eyes			
Thickened conjunctivae	—	29	3
Pingueculae	14	3	89
Lips			
Angular lesions or scars, one or both	63	80	94
cheilosis	20	45	60
Tongue			
Filiform papillary atrophy	9	4	36
Fungiform papillary atrophy	16	28	—
Furrows	20	24	61
Serrations or swellings	2		17
Red tip or lateral margins	57	58	67
Magenta	6	2	11
Gums			
Marginal redness	16	31	36
Marginal swellings	52	70	43
Recession of papillae	17	27	61
Skin			
Follicular keratosis	3	6	6
Crackled	3	22	
Winged scapulae	43	42	

with certain deficiencies. Angular lesions of the lips were found in nearly all Doña Elena adults (94%), in 63 per cent of Doña Elena children and in 80 per cent of the control children. Cheilosis was also observed in 60, 20, and 45 per cent of the same groups, respectively. These signs are commonly associated with riboflavin deficiency. Red tips and sides of the tongue which are indicative of a lack of vitamins of the B complex were observed in two-thirds of adults (67%) and in over half of the children in both groups (57 and 58%). Abnormal conditions of the gums were prominent in all three groups. Marginal redness was recorded for 36 per cent of adults, 16 per cent of Doña Elena children and 31 per cent of the controls. Marginal swellings were also found in 43, 52, and 70 per cent of the respective groups. Such conditions are commonly associated with a lack of vitamin C though other factors may also be involved. These findings are what would be expected from the dietaries of the families. There was a lower incidence of abnormal eye and skin conditions attributable to a low intake of vitamin A than would be expected from the type of diets observed.

Dental Findings.

Dentists from the Division of Dental Hygiene of the Department of Health examined the teeth of 88 Doña Elena School children and of 24 of their parents. They also examined 107 children in the control area. (Table 14.) Of the Doña Elena children only 19 per cent had no decayed teeth. The 88 children had a total of 337 cavities or an average of 3.8 per child. Nearly two-thirds of the cavities (61%) were in permanent teeth. Nearly two-thirds of the cavities were beginning ones of grade 2, but 19 per cent were grade 3 and 20 per cent of them had advanced to grade 4, 5, or 6. Similar conditions were found in the control children. The proportion free from dental decay was about the same (18%) but the average number of cavities per child was higher, 4.1 as compared with 3.8 for Doña Elena children. It must be remembered that these children were most of them under 12 years of age and that permanent teeth are meant to last a life-time. For children of elementary school age to have so many decayed teeth shows something lacking in conditions for tooth building and preservation. Poor nutrition is doubtless at least one factor.

TABLE 14. DENTAL CONDITIONS OF DONA ELENA AND CONTROL CHILDREN AND DONA ELENA ADULTS

	Dona Elena Children		Control Children		Doña Elena Adults	
	No.	%	No.	%	No.	%
Number of Cavities						
All persons	88	100.0	107	100.0	24	100.0
None	17	19.0	19	18.0	0	—
Cavities	71	81.0	88	82.0	24	100.0
Total cavities	337	100.0	435	100.0	234	100.0
Temporary teeth	133	39.0	221	51.0		
Permanent teeth	204	61.0	214	49.0	234	100.0
Average/child	3.8		4.1		9.8	
Temporary	1.5		2.1		—	
Permanent	2.3		2.0		9.8	
Peridontal Conditions	No.	%	No.	%	No.	%
All persons	88	100	107	100	24	100.0
Normal	25	28	22	20	1	4.0
Gingivitis	63	72	85	80	23	96.0
Slight	37	42	48	35	1	8.0
Moderate	26	30	37	45	11	76.0
Severe	—	—	—	—	11	46.0

Both groups had a high proportion of children with abnormal gums. A little over one-fourth of Doña Elena children (28%) had normal gums, the remainder (72%) had some degree of gingivitis, nearly one-third of them (30%) in moderate degree. This condition was even more prevalent in the control group; 80 per cent had gingivitis, 45 per cent of them in moderate degree. This condition is commonly associated with a lack of Vitamin C though other factors may also be involved.

As might be expected the dental condition of the 24 parents examined was poorer than for the children. None of them was free from cavities. The group as a whole had a total of 234 cavities or an average of 9.8 per person. Over one-third of these were of grades 4, 5 or 6. Only one of the group had normal peridontal tissues and one only slightly abnormal ones. The remaining 22 were found to have moderate or severe abnormalities. These findings for adults fore-shadow what may be expected to result in the teeth of the children unless something is done to provide right conditions for tooth development and care.

Summary.

1. The children of the Doña Elena group were very short for their age. Three-fourths of them (76%) were very short by common standards.
2. Three-fourths of them (74%) were also underweight for their height and age; 21 per cent of them by 10 per cent or more.
3. Clinical conditions commonly related to deficiencies of certain vitamins were observed in Doña Elena children as follows:
   a. Associated with riboflavin deficiency
      61 per cent had angular lesions of the lips.
      20 per cent had cheilosis.
      20 per cent had nasal or other facial seborrhea.

   b. Associated with vitamin C deficiency
      52 per cent had marginal swellings of the gums.
      16 per cent had marginal redness of the gums.

   c. Associated with iodine deficiency.
      18 per cent had slightly enlarged thyroids.

   d. Associated with lack of muscle tone
      43 per cent had winged scapulas.
4. Only 18 per cent of the children were free from dental decay. The 88 children had a total of 337 cavities, an average of 3.8 per child. 60 per cent of the cavities were in permanent teeth.
5. Nearly three-fourths (72%) of the children had gingivitis of the gums, 30 per cent of them to a sagnificant degree.
6. The findings for the control group were similar for all items but abnormal conditions were in all cases somewhat more prevalent.
7. None of the 24 adults examined was free from dental decay. They had an average of 9.8 cavities per person. All but one had gingivitis of the gums.

FACTORS OTHER THAN NUTRITION

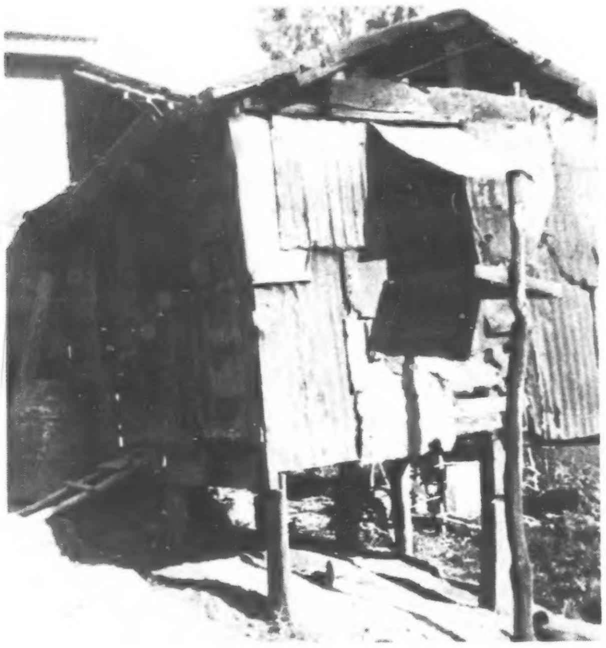


Fig. 3—A typical kitchen as found in the beginning.

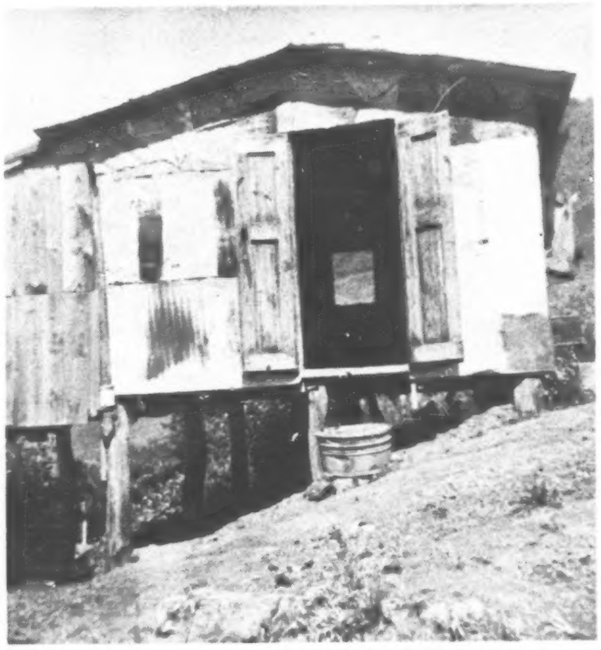


Figure 4—One of the houses rated as needing to be replaced by a new one.

Kitchens and Facilities for Cooking and Eating.

Since kitchens and facilities for cooking and eating influence the kinds of meals prepared and thus the nutrition of the family, information on these was included in the survey. The majority of the kitchens were merely miserable sheds. By a rough classification 7 per cent were rated as reasonably satisfactory and 35 per cent as in poor condition but could be repaired. The remainder (58%) were considered so bad that they should be torn down and new ones built. One was only a few pieces of old zinc leaned up against the back of the house; under it three stones placed on an old wash-tub filled with dirt served as a stove. Cooking facilities were primitive. Of the 100 families, 95 were cooking on three stones; five of these also had a small kerosene stove. Three families had kerosene stoves and two had "gas fluido" ones. The fuel used by 83 families was wood only; for many of them it was largely sticks and branches picked up wherever they could be found. Seven families used some charcoal as well as wood. (Figure 3.)

Cooking utensils were few in most homes. Nearly one-third of the families (31%) had less than ten items counting every knife, fork, or spoon. For one family the five pieces consisted of one knife, one spoon, one "pilón," one bowl, and one saucepan. Another third of the families (36%) had between 10 and 14 items. Most of these added a kettle and a coffee bag to the items listed above. The remaining third of the group (33%) had 15 or more utensils. The only items owned by as many as 90 per cent of the families were a "pilón," an iron or aluminum kettle (caldero), and a bowl (olla). (Table 15.) Next common were a coffee bag (colador de café), saucepan (cacerola), and a cooking knife. About 80 per cent of the families had these. Other items owned by 30 to 40 per cent of the families were a ladle, "picador," colandor, gourd (dita), and a dish pan. Such common articles as can openers, egg beaters, measuring cups and spoons were practically non-existent. A few illustrations of the meager equipment for cooking possessed by some housewives are given herewith:

Five utensils	Six utensils	Seven utensils	Eleven utensils
1 olla	2 calderos	1 olla	1 caldero
1 cacerola	1 pilón	1 caldero	1 olla
1 knife	1 knife	1 cacerola	1 cacerola
1 spoon	1 higüera	1 pilón	1 rollo
1 pilón	1 coffee bag	1 knife	1 pilón
18 cans	9 cans	1 spoon	2 cuchillos
		1 coffee bag	1 cuchara
			1 coffee bag
			2 ditas

Dishes and utensils for eating were similarly limited. What might seem to be a bare minimum would be at least a plate, cup or glass, knife, fork and spoon for each member of the family. This makes 5 items per family member, or 30 to 40 for a family of six to eight members and more for larger ones. Yet over half of these 100 families (53) had less than 40 items and one-third of them less than 30. Of the remainder, 21 had 40 to 49 and 26 had 50 or more. The items owned, however, were often a miscellaneous lot rather than those listed in the minimum group. This is evident from the accompanying illustrations of items owned by a number of families.

(a) 23 dishes (12 in family)
4 plates
4 glasses
10 cups
4 tablespoons
1 water pitcher

(b) 23 dishes (5 in family)
5 deep plates
3 flat plates
2 glasses
4 cups
2 teaspoons
5 tablespoons
2 forks

(c) 44 dishes (13 in family)
10 deep plates
4 glasses
6 cups
10 tablespoons
3 teaspoons
10 forks
1 water pitcher

(d) 19 dishes (3 in family)
3 deep plates
1 flat plate
2 glasses
7 cups
6 tablespoons

(e) 30 dishes (12 in family)
9 deep plates
3 glasses
3 cups
12 tablespoons
3 forks

(f) 23 dishes (12 in family)
4 plates
4 glasses
10 cups
4 tablespoons
1 water pitcher

One family (c) with 13 members, for example, has 10 plates, 10 cups and glasses together, and 13 spoons counting both kinds. This means that only 10 of the 13 members could eat at one time, with a plate, something to drink from, and a spoon to eat with.

Houses and Surroundings.

Other conditions of housing not obtained in the original interviews were observed later by the workers in visits to the homes. Over half (54%) of the houses, exclusive of the kitchens, were judged fairly satisfactory as to soundness of structure, the remaining 46 per cent needed major repairs or to be replaced by new ones

TABLE 15. TYPES OF COOKING UTENSILS OWNED BY FAMILIES

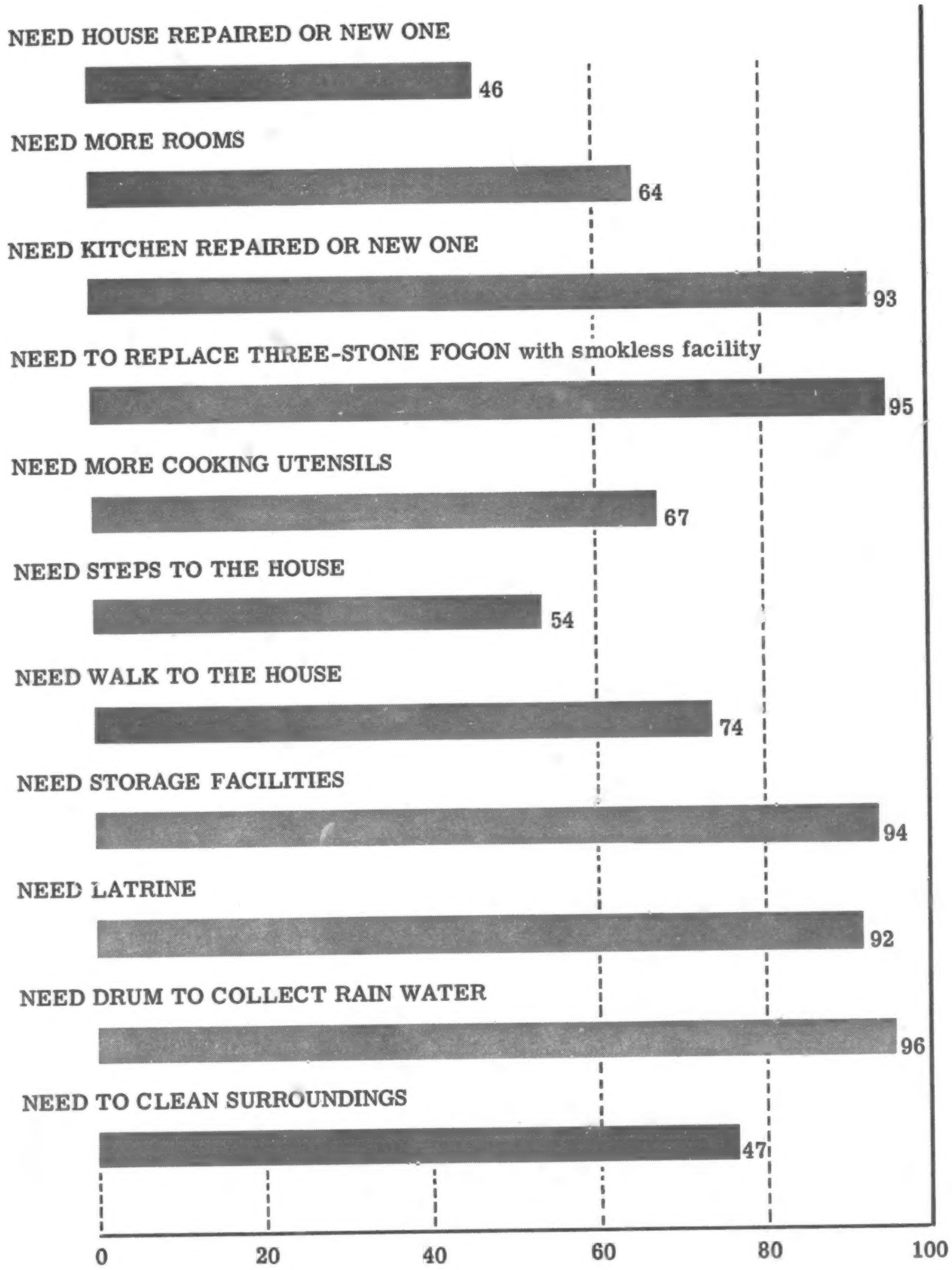
		Families Having One or More			
	No. & %		No. & %		No. & %
All Families	100				
pilon	95	ladle (1 or more)	40	egg beater	6
kettle (caldero)	92	picador	37	escudillas	5
bowl (olla)	89				
		frying pan (sarten)	38	baking pans (moldes)	0
coffee bag (colador de cafe)	84	colander	37	measuring cup	0
cacerola	70	ditas	32	measuring spoon	0
		dishpan	31	meat grinder	0
cooking knife one or more	80	can opener	23	orange squeezer	0
		"jataca"	18	pressure cooker	
cooking spoon one or more	63	grater	17		
tablespoon one or more	41				

(Figure 4.) More than half (54%) of the houses had no steps and three-fourths of them (74%) had no walk of any kind to the house. Nearly all of the homes (94%) lacked closets or storage space. Latrines were also lacking in nearly all of the homes (92%). Most of the families had to carry their water from a spring or river at some distance from their homes. Though a device for catching rain water from the roof would save them some of the trips for water 96 per cent of the families lacked even this simple device. Cleanliness of the surroundings also left much to be desired. The surroundings of less than one-fourth of the homes (23%) were reasonably clean, the remaining three-fourths (77%) were littered with cans, papers, garbage, and other types of rubbish.

Though many of the houses were sound as to structure nearly all were too small for the size of the family. Two-thirds of them (65%) consisted of only one or two rooms; about one-fourth (26%) had three rooms—usually two small bedrooms and a "sala"; and 9 per cent had four or more rooms. In view of the large size of families these houses are totally inadequate. Two-thirds of the families (66.2%) average two and one-half or more persons per room and over one-fourth (26.5%) 4 or more.

This crowding is especially important for sleeping. A bare minimum standard for sleeping is considered to be a separate room for parents, or shared only by an infant or child no more than 3 years of age and separate sleeping rooms for the two sexes for the rest of the family. For a family with a father and mother and boys or other men and girls and other women, this would mean at least three rooms for sleeping, as for example, two bedrooms and the living room. Nearly one-third of the families (31%) did not have separate rooms for parents, and in 84 per cent persons of both sexes occupied the same room. At least two-thirds of the families needed one or more additional rooms to allow for adequate sleeping conditions for their families. The chief housing needs are graphically shown in Chart 8.

CHART 8. Housing Needs of 83 Doña Elena Families.



Community Facilities and Services

From the first visit to the area it was evident that there were over-all community problems that must be considered.

Roads. Most important of these was roads. As already indicated, only a jeep road served the community. This was rough and rutted and impassable even by a jeep after heavy rains. Moreover, the majority of families lived among the mountains with only foot-paths to the road. This lack of roads is basic to many of their problems; getting their produce to market and supplies to their homes; attendance of children at school and of parents at meetings; the visits of agency workers to their homes and the contact of the family with the outside world.

Water and Electricity. Water in practically all families had to be carried from a stream or other source at some distance from the home, usually up and down hills. This naturally limited the amount of water used and therefore influenced the cleanliness of the houses, the clothing and also of the persons in the family. Clearly a source of water near at hand was needed by all families.

Electric light poles had been set along the ridge and wires strung by a contracted agency. The poles were, however, too far apart, the wires sagged and the system was not working. If this system could be put into operating condition, it would serve about one-third of the families. Extension to the other sections would be needed to serve the remainder. This would provide not only lights for the families but what is more important it would make it possible for them to have refrigerators, electric irons and other conveniences.

Service of Government Workers

Puerto Rico has a large number of government employees whose duties are concerned with some aspect of the welfare of people. Among these are public health nurses, social workers, agriculture and home agents of the Extension Service, vocational agricultural agents and home economists, community education organizers, and teachers in the schools. In the interviews with the families they were asked concerning the contacts they had with such workers. This includes the number of visits they had from each of these workers, the number of adults that belonged to or attended extension clubs, and the number of youth belonging to 4-H or other youth clubs.

The findings showed that these 100 families had very little contact with such agencies. In 60 per cent of the homes no worker from any agency had visited the home during the past year. In 27 homes one worker had been to the home, in a few cases twice. Eleven of these visits were made by teachers, 6 by Extension agents, the others by a number of workers. The remaining 13 families had had two or more visits from some workers. The total visits reported for these 100 families by all workers was 55, an average of less than one per family (0.55).

It might be expected that a goodly number of these rural families would be associated with some educational group or agency. But such was not the case. No adults belonged to any group though 4 men had attended one or two meetings of Extension groups. Of the 100 families, 68 had children of club age making a total of 213 boys and girls 10 to 20 years of age. None of them belonged to any club though four boys of the group sometimes attended meetings, two a Future Farmer group, one a 4-H group, and one a Boy Scout Club.

Contacts of Housewives

Since the women of the families had little education and none of them were in any Extension or other activities, it was of interest to know what opportunities they had for contacts outside of the family. In 80 of the families someone comes to the home once a week or oftener, and 48 of the housewives visit another home at least this often. Over one-third of the women (38%) go to church weekly and one-fourth (25%) go once a month. Only four women had been to a movie during the past year, one of them twice. Two of these were community education movies. Some housewives have few if any outside contacts; 13 almost never have same one come to the home; 42 almost never go to other homes; 82 practically never go to meetings other than religious ones; 19 seldom or never go to church; and 96 never go to movies. From the fore-going it is seen that the church is the only agency with which any significant number of house-wives have contacts.

Summary.

This section can best be summarized in terms of what the families need:

1. Ninety-three of the families need better kitchens; 35 per cent of the kitchens can be repaired, but 58 per cent need to be replaced by new ones.
2. Ninety-five per cent of the families need better cooking facilities than the three stones they now use.
3. At least two-thirds need more equipment for cooking, and also more dishes for eating.
4. Ninety-four per cent need storage place both in the kitchen and in the house.
5. Forty-six per cent need to repair their houses or build new ones.
6. At least two-thirds need additional rooms to provide decent sleeping conditions.
7. Fifty-four per cent need steps to the house.
8. Seventy-four per cent need a walk to the house.
9. Ninety-two per cent need latrines.
10. Ninety-six per cent need drums and eaves to catch rainwater.
11. Seventy-seven per cent need to clean their surroundings.

In addition to these needs of individual families the community as a whole needs:

1. Roads, both a hard road to the center and at least jeeps roads to the different sectors.
2. Latrines for practically all families.
3. A safe water supply.
4. Electricity for lights and refrigeration.
5. Services from government agencies.

PART III

THE FIRST YEAR'S PROGRAM AND SOME OF THE RESULTS

2

46/47

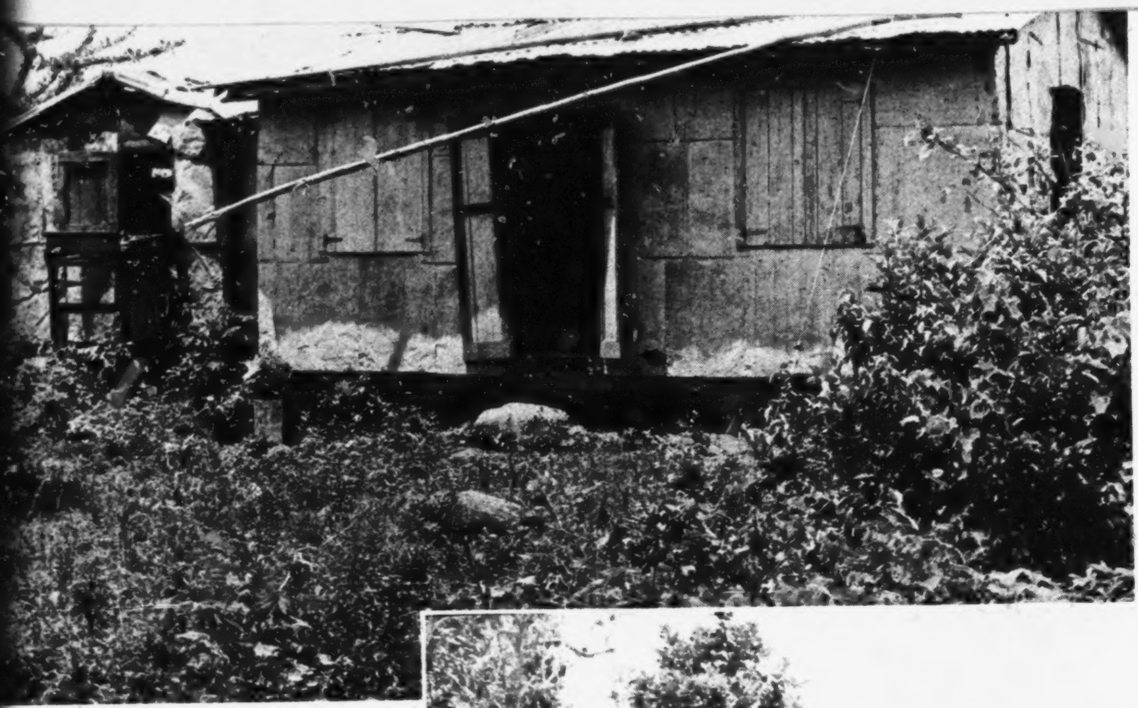


Figure 5—The house for our workers as we found it.

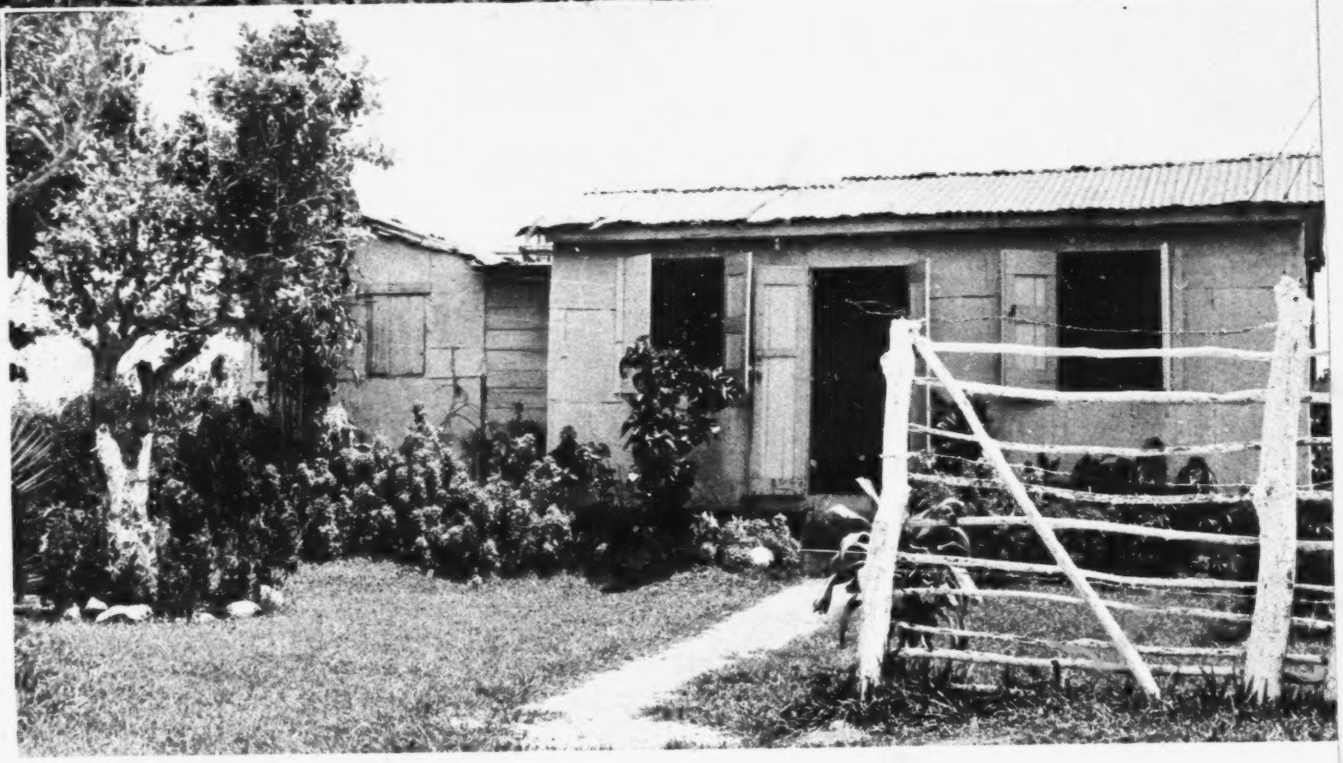
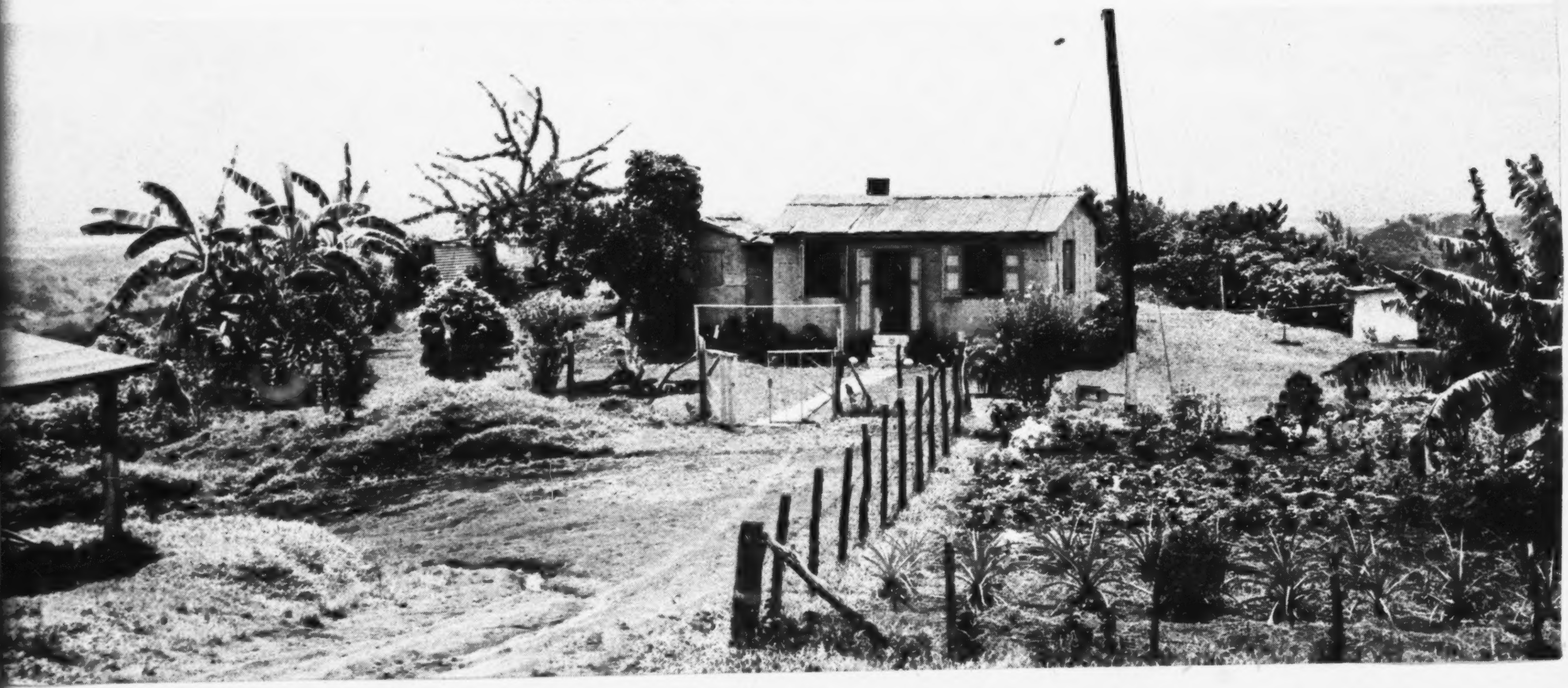


Figure 6—The same house two years later.

Figure 7—Recent view of house and surroundings. Note: latrine at left, shower room at right, garden and banana trees, fence, electric light wires.



THE FIRST YEAR'S PROGRAM AND SOME OF THE RESULTS

THE PROGRAM

The findings revealed by the home interviews and the results of examination of physical status formed the basis for the program to be carried out. Since emphasis at the beginning was on nutrition it was planned to include four main procedures:

1. The children in the school were to be given three meals a day instead of merely the noon lunch that they had previously been receiving. The school and the lunch-room were to be used for teaching and inculcating good food habits.
2. The school children were to be weighed weekly under standard conditions and their heights taken monthly.
3. Parents and other adults were to be taught the essentials of good nutrition and how to secure it through everyday foods. This was to be done through meetings of the people and through visits to individual homes.
4. A strong educational program was to be carried out to increase the home production of essential foods—milk, protein foods, vegetables and fruits.

Almost from the outset, however, as will be shown later, the program was of necessity expanded to include all major aspects of home and community living.

Community Workers.

It was agreed from the beginning that a prime essential of the program was that there should be workers living in the community to carry on the day to day work with the families. By good fortune two young people were found who were willing, and even enthusiastic, about undertaking this assignment. They were Carmen Luz Santiago, home economist, and her brother Alejandro, an agronomist. They had grown up in the country, they had an understanding of and liking for rural people, and their personalities were such as to make them well-suited for this situation. Though both were concerned with all aspects of the program, Carmen was primarily responsible for the meals of the children, the weighing and measuring program, and work with out-of-school girls and the women. Alejandro was in charge of the home food production program. He was also driver of the jeep and in general became involved in every type of job that falls upon a man about the place. It is due largely to the interest and devoted service of these two workers that the success achieved by the program can be attributed.

Finding a place for these workers to live was a problem. Finally a small, long-neglected house was found which could be rented. It was located in a field and was reached only by a footpath over the hills. It was in a bad state of repair but the framework was sound and could be made livable. Broken floors, windows and walls were repaired, steps built, the house painted, the yard sodded, shrubs and

481

flowers planted, a cement path built to the house and a latrine installed. Through the courtesy of the mayor of Naranjito a road was bull-dozed from the main road to the house. The house was furnished with odds and ends of furniture from the store-room of the University of Puerto Rico. The house has three small bedrooms, a small "sala" and a kitchen. With two cots in each of the two bedrooms and one each in the smallest bedroom and "sala" it was possible, if necessary, to sleep as many as six persons. Actually three or four were the most to be housed at any one time. (Pictures of the house before and after are shown in Figures 5, 6, 7.)

This house, simple as it was, had a "homey," attractive atmosphere, and became a pattern which families in the community might follow since the things done were ones many of them might do with their own homes. They were all familiar with what the house had been and were amazed to see the transformation effected by such simple means. Established in this house the workers were at once accepted as neighbors. They were visited almost nightly, invited to "coffee" or meals in the homes and welcomed as friends when they visited families through the area.

These two resident workers carried the greater part of the day-to-day work with the school and the community. They were guided and assisted by the sponsors of the project. One or more of them visited the place weekly. They brought needed supplies and gave suggestions and encouragement to the workers. They helped conduct meetings with the people of the community as described below. They were the contact persons with directors of government agencies responsible for certain services and instrumental in persuading them to supply needed services to the area. Later in the year the Agriculture Extension Service gave part time of an Agriculture Agent and a Home Demonstration Agent to the project.

The Superintendent of Schools of Comerío gave his support and assistance throughout. On occasion he brought his home economics, industrial arts and agricultural teachers to assist in some home improvement project. He attended and participated in the general meetings with the people and lent his support in every possible way. The mayor of Comerío also attended most of the general meetings and identified himself with the program and helped in many ways.

The School Feeding Program.

The school had formerly been on the double shift system, half of the children coming in the morning, the other half in the afternoon. In order to serve them three meals it was necessary to have an all-day session for all children. To effect this an extra teacher was provided through the cooperation of the Secretary of Public Instruction and the local Superintendent of Schools. The school-house was divided into three rooms to accommodate the three groups. One teacher had first and second grades, one third and fourth, and one fifth and sixth. A total of 97 children were enrolled in the three.

The Meals. Breakfast was served from 7:30 to 8:00 a.m., lunch from 11:30 to 12:00 m., and supper as soon as school closed at 4:00 or 4:30 p.m. The lunch served was the same as that provided for all lunch-rooms throughout the Island. The breakfasts and suppers were planned to complement the lunches so that the day's total food should meet the standard requirements for adequacy. The nutritionist was responsible in cooperation with the central lunch-room staff for the planning of the meals and the supervision of the lunch-room. She also kept a record of attendance at meals and of foods eaten. The teachers were in charge of routing the children and for their general management.

The facilities for feeding the three meals were furnished by the School Lunch Division of the Department of Public Instruction. The foods were supplied under the same plan as for school lunches. The Food Distribution Division of the U. S. Department of Agriculture provides such foods as are available as surplus commodities and the local Department of Public Instruction, School Lunch Division, provides the extra foods needed to complete the Federal requirements for a complete lunch. The local authorities must also provide the building, equipment, and workers for preparing and serving the meals.

To serve three meals required some additional facilities. Extra workers were employed by the School Lunch Division to take care of the extra work involved in preparing and serving the meals. The lunch-room was small, poorly equipped and uninviting. An enlarged, practically new lunch-room was approved by the school authorities. There were many delays, however, in its construction and it was not completed until about six months after the program started. To provide space in the meantime a large tent was borrowed from Civil Defense, set up in the school-yard and used until the lunch-room was completed.

The Weighing and Measuring Program.

The children were weighed weekly by the nutritionist in charge of the program. Weights were taken with the subject nude or in a garment of known weight, at the same time of day each week. Heights were taken monthly on a stadiometer made and used according to directions of the Iowa Institute of Child Welfare. To insure standard measurements the following directions were given to the child: Heels against the board; back and head against the board; eyes looking straight ahead. Under these conditions heights could be duplicated within about 0.1 inch.

Meetings with the People.

The Motivating Meeting. As already indicated two meetings were held with the people before the project was begun to acquaint them with its purposes and plans and to insure their cooperation in the program. They came together again for the medical examinations though no meeting was held. Since they were given no advice or report on the findings at the time of the examinations—merely examined and sent on their way—it seemed desirable to call them together and tell them the results at least in a general way. This meeting was called and a goodly number, mostly the parents of the children, assembled on a Sunday afternoon which was their choice of time for meeting. Present at the meeting were the sponsors, the superintendent of schools, the mayor, the local workers, and the teachers. Since this meeting was the motivating one for the whole program a brief outline of the way it was developed is given here. (See figures 8, 9, 10.)

1. One of the sponsors explained briefly the general condition of the children revealed in the examinations. She described some of the signs of poor nutrition that showed that the children were not getting all the things their bodies needed for good nutrition and health. (Figure 8.)

Figure 8—Sunday meeting. Dr. Zayas explaining results of medical examinations.

ALIMENTOS PROTECTORES

Figure 9—Sylvia Rodriguez explaining basic chart, and how the medical findings were related to the lacks of protective foods.

Figure 10—Mr. Berrios explaining how they can get all the protective foods by raising them.

2. Using the chart "Protective Foods for Puerto Rico" she showed them the foods that are needed for good nutrition—milk, protein foods, yellows and greens, and fresh fruits. (Figure 9.) She pointed out that their common diet of rice, beans, viandas, codfish, and coffee lacks one or more of these foods, and she related these lacks to the conditions found by the doctors. She urged them to try to have these foods in their meals.
3. The agronomist explained that they could produce these four protective foods on their own land. (Figure 10.) They could have cows or goats that would produce the milk they needed. (Group 1.) They could raise pigs, chickens, or rabbits to supply the protein foods in Group II. They could have gardens and grow the yellows and greens of Group III, and fruit trees to supply the fresh fruits of Group IV. He explained that he and the project agronomist were there to show them how they could do these things and to help them to do them. A leaflet summarizing the program was distributed.

Much lively discussion and many questions followed the presentation. The group seemed to be definitely impressed and anxious to do something about it. The people were then asked how they would like to come back for at least four more meetings so that each time they could learn more about one of these four foods. They would learn why they needed each food and how they could get it through their own efforts. All indicated that they would like to do this and it was agreed that the meetings would be once in three weeks on Sunday afternoons at two o'clock.

Later Meetings. Each of the later meetings was devoted to one of the four protective foods. In each case the reasons why the food is needed was graphically presented. Then followed a discussion of the practical problems of how they could get it and use it. The lesson on yellows and greens was followed by a demonstration of cooking greens and yellow sweet potatoes and everyone had tastes of the products. They were given sweet potato vines to take home and plant and also "calabaza" seeds. They were urged to start gardens and arrangements were made to help them get seeds and advice on planting them. At the fruit meeting, a talk was given on what fresh fruits contributed to the diet and they were given some fruit trees that had been supplied by the Department of Agriculture. The fruits were acerola, papaya, guava, and lime. The people had never heard the story of the richness of the acerola and were, therefore, especially eager to have it.

The day that the meeting was on Milk the high-grade milk goat of the Department of Home Economics of the University was taken along in the jeep. Word had been broadcast that it was to be there and about 125 persons, not counting children, were on hand when it arrived. They crowded around the goat and examined it as if it were an animal in the zoo. They watched it being milked and were amazed when it yielded three full quarts. "More than any cow gives," exclaimed one man and most of the other cow-owners could have said the same. At this same meeting the government's program for providing cows or milk goats for low income families was explained and a number of them that could meet the requirements filled out the blanks of application for them.

One of these general meetings was devoted to the improvement of the cleanliness and general appearance of surroundings. The simple things all could do to make their homes more livable and attractive were pointed out. A leaflet summarizing the things anyone could do without cost was given them as a reminder.

Area Meetings. Although there was good attendance at the general meetings, it was noted that not all families were represented. The distance they had to travel over hills and bad roads was in itself enough to account for many of them not coming regularly. It was decided, therefore, that most meetings thereafter should be held in different areas more accessible to the people. An aerial map of the section was secured and the houses of the families located on it. It was then divided into five areas and a place found in each where people could meet. In some it was a store, in others a house large enough to accommodate a group. A number of meetings were held in these areas and many persons attended who had been unable to go to the general meetings. A local leader was chosen for each area and the five leaders constituted a local council.

The Home Food Production Program.

With the low income of these families the chief hope of improving their nutrition would be by the production of as much as possible of their own food. Goals toward which to aim in a long-time program were, therefore, set up as follows:

Goals for a Home Good Supply

1. A garden for every home with at least the following vegetables: calabaza (may be planted in the plantain or wherever it has place to spread); greens of some kind, green beans, lettuce, tomatoes, peppers, and cabbage. Others as desired.
2. At least one row of yellow sweet potatoes (batata mameya).
3. A row of pigeon peas (gandules).
4. Fruit trees. Orange or grapefruit or both, papaya, acerola, and others as suited to the situation.
5. A flock of 12 to 15 hens of good breed for each family of 5 to 6 persons, more for large ones.
6. One or more cows or goats of good breed that will supply enough milk to provide at least one pint a day per family member.
7. Some meat-producing animal to supply good quality protein, as pigs, or rabbits or both.

Gardens. In the general meetings the need for gardens was graphically presented with the aim of motivating the people to want them. Some instructions for planting vegetables were given and sweet potato vines and some seeds were distributed. The agronomists also worked with families individually. They found that getting seeds was the first problem. To solve this they bought seeds in quantities from the Experiment Station, put them into small packets and made them available at cost to the people. They helped men plan garden plots and gave demonstrations to small groups of how to plant them. They made many visits to observe progress and to give encouragement.

There were several handicaps to this program. First of all, the best time for planting gardens is also the time for planting tobacco, and the tobacco takes precedence over everything else. Some farmers did plant gardens in the tobacco seed beds after the plants had been removed. If planted too late, however, the dry season arrived and the crop was lost and with it the enthusiasm for having a garden. The basic reason for not having gardens, it must be admitted, is the lack of any real conviction on the part of the people that vegetables other than viandas are important. They need no persuasion to want such tangible things as roads and lights and they would like more milk and eggs and meat. But they have never been accustomed to eating vegetables other than viandas to any extent and it is difficult for them to believe that they are essential to health. There is, moreover, no tradition for having gardens among Puerto Ricans in general. Nevertheless interest was aroused and some progress made as will be reported later.

Cows. The help given the families to have cows was through the government program for making cows available to low income families. To be eligible for this program a farmer must have an income below a specified sum but must also have land to raise feed for the cow and a place to house it. He must also make a down payment and then small monthly payments. Only 13 of the families who applied could meet these requirements. Nine of these eventually received the cows which were almost ready to calve and soon had a supply of fresh milk.

Chickens. A plan to improve the breed of chickens was set up. A flock of 10 hens and a rooster of good breed were taken to the area and put in charge of one man. People were allowed to bring their eggs and trade them for the fertile ones from this flock. They then set the eggs and were expected to raise the chickens that were hatched for laying hens. The person in charge of the hens used some of the eggs received in trade and sold the rest to buy feed for the chickens. A few families who could afford it were helped to secure baby chicks. This project was started toward the end of the year and its success could not be assessed until later.

Rabbits. A program for raising rabbits was started with the club boys under the direction of the Agricultural Extension Agent. A number of rabbits were distributed among boys who had already built hutches for them. They were taught how to feed and care for them. Each boy agreed to give the first litter born to other boys; they could then keep the remainder to provide a source of fresh meat for the family. The boys who were given the rabbits agreed to follow the same procedure. It was hoped by this plan eventually to have them well distributed over the area.

Home Improvement: Kitchens.

Since the project started as a nutrition one, efforts were at first centered on factors affecting it. But other conditions of living were included in the program as the time of workers and facilities permitted. The first attack was on kitchens. Most of the families, as has been noted, were cooking on three stones in miserable sheds not worthy of the name of kitchen. The walls were black with smoke and the eyes of women cooking in the kitchens suffered from it. A check was made to learn if families could afford to buy kerosene stoves. Some said they might buy a small stove but could not afford to buy the kerosene to use in it. Moreover, it would not be large enough to cook enough food for their large families. It was evident that for some time most families would continue to cook with wood. A program for building smokeless cement stoves was, therefore, started. This stove is a modification of one devised by an engineer, Dr. S. P. Raju, for use in India.* It was there built of clay and cow-dung. Here it was decided to use cement which is a locally produced product and the cost, about $2.00 a stove, within the means of many of the families.

To start the program the project workers built a simple kitchen and the stove in the home of an old couple living near the road who would be unable to do so for themselves. (Figure 11.) They were so proud of it they brought all their neighbors and passers-by on the road to see it. Everyone who saw it wanted one, and with the help of Alejandro Santiago some began building them. (Figs. 12, 13.) But to have a stove meant that a new kitchen would first have to be built. Moreover, getting the cement in over the hills was also a problem. Since the program started late in the year it was only just getting well under way by the end of the first year.

At the end of the first six months another home economist was added to the staff thus making possible more work with individual homes. The two workers visited every home and checked the conditions and facilities against a minimum standard for decent living. In this and later visits they tried to show the families the importance of the different items, especially ones that they could do for themselves with little or no cost such as cleaning the yard and surroundings, making steps for the house and a walk to reach it, and cleanliness in the home. They also talked with the families about the possibility of repairing their houses, building new kitchens and stoves and other matters depending on the home visited. In the summer one home economist used a school-room for a workshop and taught a group of older children and some adults how to make some simple pieces of furniture from boxes and other waste materials. The biggest problem was to find enough materials with which to work as there are none in the area. This program would readily be accepted if materials and a place to work were available.

Electricity.

Electric light poles and wires had been installed and some families had wired their houses but the system was not working. It was learned that work had been done under contract with a private agency. The poles had been set too far apart and the wires sagged. The work had not been accepted by the Water Resources Authority. The sponsors took up the matter with the top officials responsible, who saw that repairs were made and the system put into service. About five months after the project began families along this line had electric lights. The school-house too was also finally wired.

Roads.

The question of roads came up at every meeting and rightly so since they are basic to all other problems. As a first step in improvement the mayor of Comerío sent a bull-dozer over the road from Palomas to the foot of the school hill, and the mayor of Naranjito did the same for the road from that town to where it joins the Palomas one. This made the roads temporarily better as it removed the ruts. But heavy rains soon started new ones as well as leaving the roads slippery with

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S. P. Raju, "Smokeless Kitchens for the Millions." The Christian Literature Society, Madras, India, 1953.

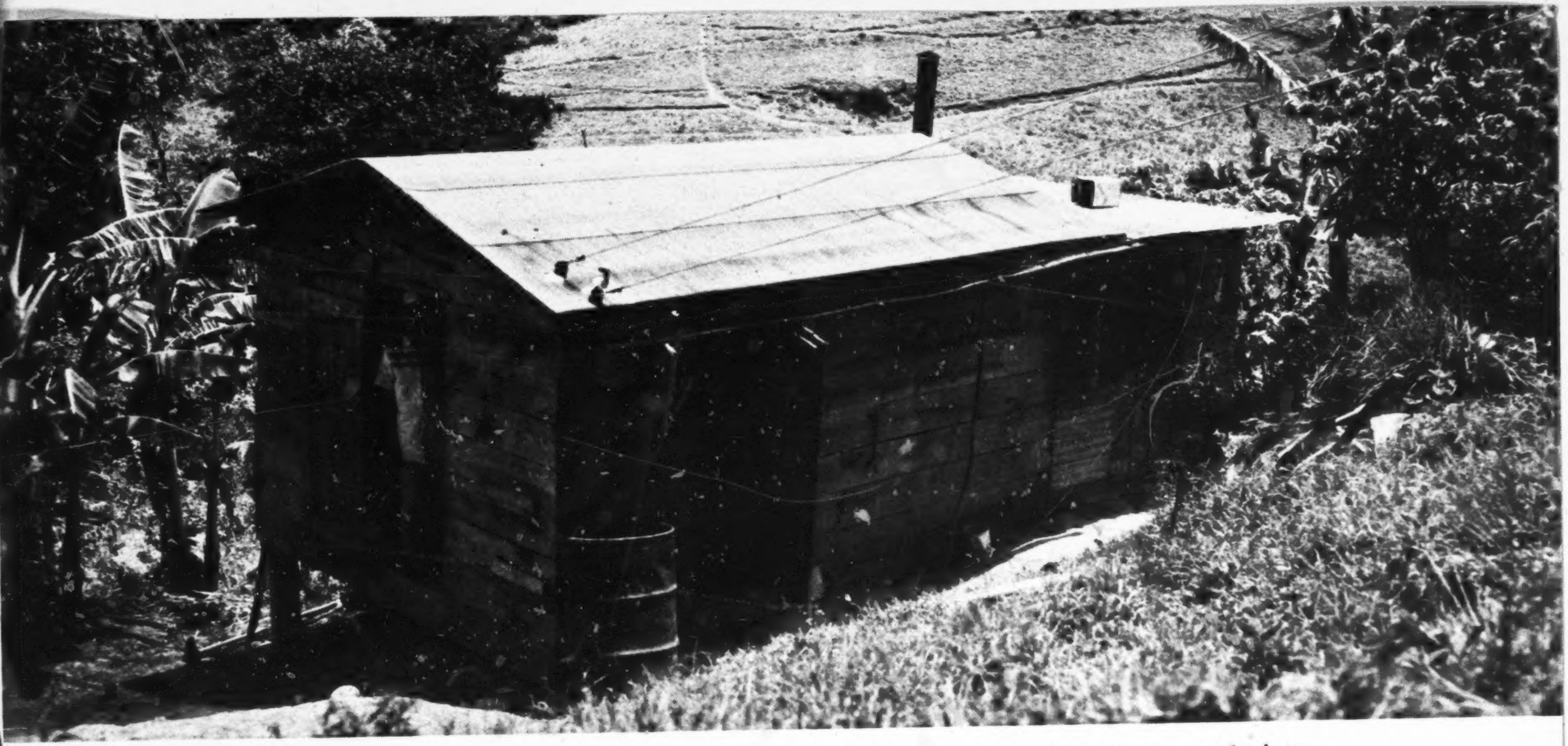


Figure 11—House in which the first cement stove was built for demonstration. House had no kitchen, so a simple one was built, and a stove, cupboards, etc. built inside. Note the chimney. House also has eaves and drum for water.

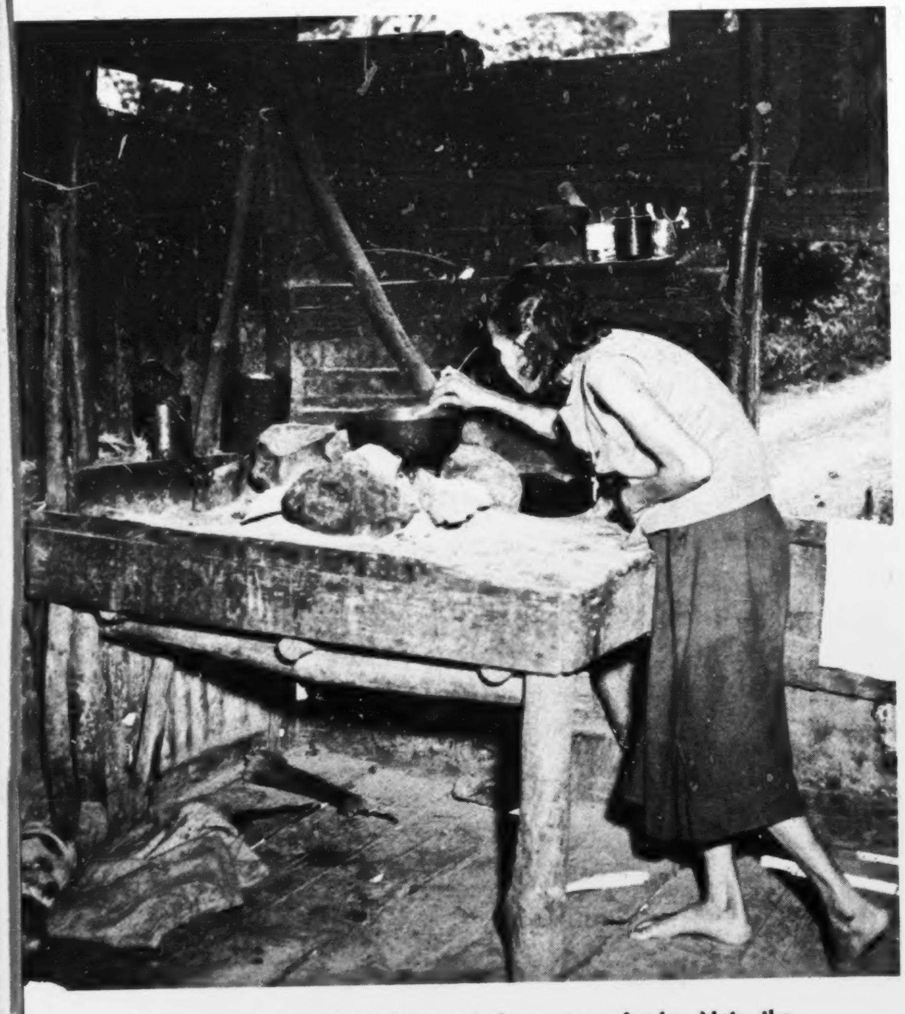


Figure 12—A typical kitchen and three stone fogón. Note the smoke-blackened walls.

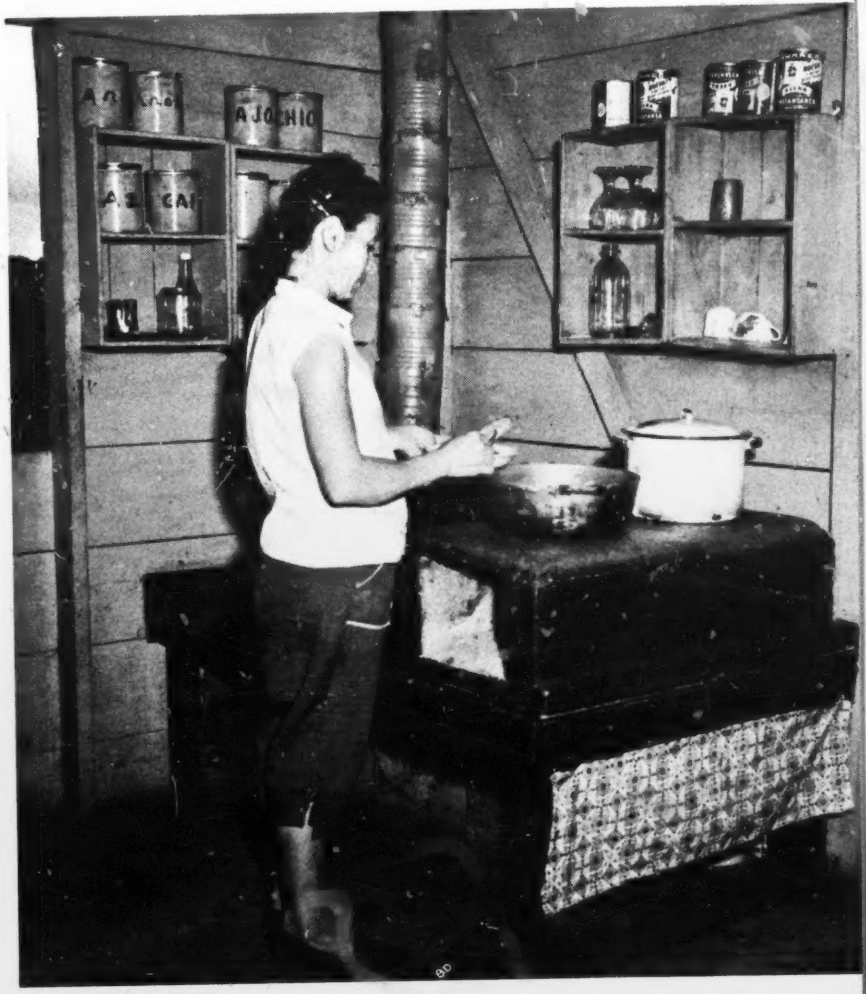


Figure 13—Sample of new kitchen with cement stove. Note chimney made of cans from the school lunch, and improvided cupboards.

red clay. At the close of the year plans were being made to pave the Naranjito road and to build a hard one for part of the way from Palomas.

Latrines.

As already noted practically all families needed latrines. Their interest in them had been aroused by some health worker and some of the men had dug the pits for the promised latrines but as yet none had been delivered. The sponsors took the matter up with health department officials responsible. They investigated the matter and provided latrines, that is, the cement platform and seat. These were delivered at the school and families came for them there. A few men came with horses and loaded the latrines on them. Others loaded them on their own heads and trudged off over the hills carrying them. At least two trips were necessary to carry all the parts. In later visits of workers to the homes it was found that all but one or two families had them already installed and had built the sheds to cover them.

Drums and Eaves for Catching Rain Water.

It was agreed that the water situation could be relieved in part by facilities for catching rain water from the roofs, that is by eaves and drums. When the idea of having them was proposed all families welcomed it but did not know how or where to get the drums. The sponsors, therefore, set out to help secure them. They would hear of 25 empty drums in one place, 19 or 20 were located in another section, and from time to time a few were discovered here and there in other places. Some were provided by the Department of Health others by Public Works. By this means enough drums were accumulated eventually to provide most families with them. The drums were rounded up by Alejandro Santiago and the school lunch-room four-wheel-drive truck was pressed into service to haul them to the area. Families were informed that the ones who had the eaves (or "canales") built on their houses would be first to receive them. The men came to the school or other designated place to get them and carried them away on their heads or in a few cases on the back of a horse. These drums hold enough water to last from rain to rain in the rainy season but are inadequate during the dry season. Large cement tanks are needed for this.

PROGRESS DURING THE FIRST YEAR

At the end of the first year an appraisal was made of the progress attained and the problems that had arisen during that period as basis for planning future work. The children of both Doña Elena and the Control Group were re-examined under the direction of the same physician and their growth in height and weight determined. Homes were revisited to observe any improvement that had been made in home food production, housing, and other aspects of living.

In the Growth of the Children

The Matched Groups.

It is not easy to determine the effect of a feeding program on the growth of children since most children grow some anyhow, and there is no sure way of knowing how much they would have grown without the extra program. The best evidence is obtained by comparing their gains with those of a control group whose ages, heights, and weights at the beginning are the same. In this study each Doña

Elena child was matched with a control child of the same sex, height, weight, and age. This was made possible because of the larger number of children in the control community whose measurements had been taken (146 vs. 97). By this means 41 pairs of boys and 36 pairs of girls were formed. When their progress was assessed at the end of the year, it was found that a few children from one group or the other were not available for comparison. Nevertheless, there remained 60 pairs, 31 pairs of boys and 29 pairs of girls, a total of 120 children who were well matched on the basis of the original measurements as shown in Tables 16 and 17. It may be seen that the matching for individual pairs is close in all pairs and in some pairs almost perfect. In any case the averages for the two groups are almost identical as shown in the summary below:

	No.	Average Age Years	Average Height (In.)	Average Weight (Lbs.)
Boys				
Doña Elena	31	8.22	45.9	46.1
Control	31	8.20	46.1	46.2
Girls				
Doña Elena	29	9.05	48.0	52.2
Control	29	9.07	48.1	51.5

It is seen that the two groups, both boys and girls, had an even start at the beginning. They are the same average age, average height, and average weight. With groups as well-matched as these, the differences in gains found at the end of the year should be significant. Three types of comparison of the progress of the two groups have been made; (1) average gains in height and weight during the year, (2) the percentage of children making their "expected" gains and (3) the number of pairs in which each of the partners gained the most.

Average Gains in Height and Weight of Matched Groups.

The average gains in height and weight for the two groups are shown in Table 18. In height, Doña Elena children gained a total of 36.6 inches more than the controls during the school year. This makes an average excess per child of 0.61 inch. Since the average expected gain in height for these years is two inches, this excess amounts to nearly one-third of a year's expected increase. In weight, Doña Elena children gained 120.4 pounds more than their controls, or an average excess per child of two pounds. For these ages this is nearly half of a year's expected increase.

TABLE 18. AVERAGE GAINS OF MATCHED GROUPS THE FIRST YEAR.

	All	Boys	Girls
HEIGHT			
Total gains (inches)			
Doña Elena	135.5	66.7	67.8
Control	98.9	47.0	51.9
Difference	36.6	19.7	15.9
Av./child	0.61	0.64	0.55
WEIGHT			
Total gains (lbs.)			
Doña Elena	401.4	178.4	223.0
Control	281.0	119.1	161.9
Difference	120.4	59.3	61.1
Av./child	2.0	1.9	2.1

TABLE 16. AGE, HEIGHT AND WEIGHT OF BOYS IN MATCHED GROUPS AT THE BEGINNING (AUGUST 1958).

	DONA ELENA			CONTROL		
	Age	Ht.	Wt.	Age	Ht.	Wt.
1.	6	40.00	34.50	6	39.90	37.00
2.	6	41.75	42.00	6	41.50	42.00
3.	6	40.50	33.50	6	42.13	35.00
4.	8	46.25	52.25	7	45.75	52.50
5.	8	46.75	48.25	7	47.75	51.50
6.	6	41.20	37.25	6	41.25	38.25
7.	7	46.20	42.00	7	45.60	41.50
8.	6	42.50	37.25	7	43.25	37.50
9.	7	42.30	39.75	7	42.00	37.00
10.	7	45.80	47.75	7	46.13	46.00
11.	9	45.60	43.50	7	46.00	42.50
12.	7	49.90	53.25	7	50.25	54.00
13.	12	47.80	50.00	8	47.75	50.50
14.	9	46.25	51.25	8	45.75	49.75
15.	9	46.80	48.60	8	47.40	48.50
16.	9	45.75	47.00	8	46.00	47.75
17.	8	46.10	46.10	8	46.25	46.13
18.	8	47.00	55.50	8	47.75	49.00
19.	10	42.25	40.00	8	41.60	37.50
20.	6	48.60	51.75	8	48.50	52.00
21.	11	47.00	43.50	8	45.90	42.50
22.	7	47.00	45.50	9	47.50	47.25
23.	10	47.40	51.75	9	47.25	50.00
24.	8	50.70	56.25	10	50.50	54.00
25.	9	46.30	43.25	10	47.90	53.00
26.	9	47.80	45.75	10	49.13	49.50
27.	10	47.20	54.75	10	47.60	50.00
28.	9	46.00	42.00	11	45.60	45.00
29.	8	47.00	47.00	11	47.00	49.00
30.	12	50.60	53.25	13	50.75	51.00
31.	8	46.25	46.00	9	46.25	45.00
	255	1,422.55	1,430.35	254	1,427.89	1,432.13
Average	8.22	45.9	46.14	8.20	46.06	46.20

TABLE 17. AGE, HEIGHT, WEIGHT OF GIRLS IN MATCHED GROUPS AT THE BEGINNING (AUGUST 1958)

	DONA ELENA			CONTROL		
	Age	Ht.	Wt.	Age	Ht.	Wt.
1.	7	39.00	35.75	6	39.25	35.00
2.	10	47.60	52.00	7	47.50	48.25
3.	11	47.25	52.25	7	47.00	49.50
4.	7	43.60	40.10	7	43.40	37.00
5.	8	45.50	44.75	7	45.25	45.00
6.	8	44.13	39.25	7	44.40	41.50
7.	7	45.20	43.00	7	46.50	48.00
8.	6	42.90	33.25	8	43.75	36.25
9.	11	49.10	52.75	8	47.90	47.00
10.	6	42.25	39.00	7	42.00	38.25
11.	7	43.40	45.10	8	43.25	41.75
12.	7	44.20	41.50	8	44.25	41.00
13.	9	48.50	53.00	9	49.75	48.13
14.	10	47.80	46.00	9	48.90	47.00
15.	9	47.25	51.75	9	44.40	53.00
16.	7	45.90	45.25	9	46.40	45.75
17.	9	50.00	53.00	9	49.75	50.75
18.	10	47.90	55.50	9	46.75	52.00
19.	9	47.20	47.75	9	47.00	44.25
20.	10	54.00	65.00	10	52.75	63.75
21.	10	50.30	53.75	10	49.75	46.00
22.	11	51.50	66.00	10	52.50	69.00
23.	10	50.80	56.60	10	51.00	58.00
24.	9	49.00	52.00	11	49.40	56.00
25.	11	51.90	60.25	11	52.60	59.50
26.	15	53.50	66.25	12	54.00	61.00
27.	14	57.40	94.00	13	59.25	97.00
28.	12	52.60	56.00	13	52.50	61.75
29.	14	53.30	71.50	13	54.00	71.00
	274	1,392.98	1,512.30	263	1,395.13	1,492.38
Average	9.05	48.03	52.15	9.07	48.13	51.46

Percentage of Expected Gains

In the extent to which individual children made their "expected" gains the results are again in favor of Doña Elena (Table 19.) In height 82 per cent of Doña Elena children made their expected gains, and 58 per cent exceeded it by 20 per cent or more — 25 per cent of them by 50 per cent or over. In contrast, 42 per cent of the controls gained their expected, and 17 per cent exceeded it by as much as 20 per cent. At the lower end of the scale only 5 per cent of Doña Elena children gained less than 80 per cent of the norms; in contrast 37 per cent of controls fell below this level.

In weight, the picture is similar; 85 per cent of the Doña Elena group made their expected gains, 40 per cent of the controls; and 53 per cent of them gained 20 per cent or more above their expected, 18 per cent of the controls. At the other extreme only 8 per cent of Doña Elena children gained less than 80 per cent of the normal amount as compared with 43 per cent of the controls that fell below this level.

TABLE 19. PERCENTAGE OF CHILDREN IN MATCHED GROUPS MAKING EXPECTED GAINS IN HEIGHT AND WEIGHT (FIRST YEAR)

Per Cent of Expected	Doña Elena %	Controls %	Per Cent of Expected	Doña Elena %	Controls %
HEIGHT			**WEIGHT**		
All Children	100.0	100.0	**All Children**	100.0	100.0
100 or more	81.7	41.6	100 or more	85.0	40.0
150 and over	25.0	8.3	200 or more	16.7	3.3
120-149	33.4	8.3	150-199	36.7	10.0
100-119	23.3	25.0	120-149	20.0	8.3
			100-119	11.6	18.4
Less 100	18.3	58.4	Less 100	15.0	60.0
90-99	5.0	5.0	90-99	3.3	3.3
80-89	8.3	16.7	80-89	3.3	13.4
70-79	5.0	16.7	70-79	1.7	3.3
Less 70	—	20.0	60-69	6.7	11.7
			Less 60	—	28.3

Number of Times Each Partner Made the Best Gains.

The most exacting comparison is how each child's gains compared with these of his partner. Since the partners in each pair were well-matched at the beginning, the children could be considered as if they were lined up pair by pair to run a race and the one in each pair that made the best gains or "won" determined. Even by this severe test, the Doña Elena children had the best record:

In height
The Doña Elena *boy* won in 25.5 pairs, or 82%
The Control boy won in 5.5 pairs, or 18%

The Doña Elena *girl* won in 20.5 pairs, or 71%
The Control girl won in 8.5 pairs, or 29%

In weight
The Doña Elena *boy* won in 24 pairs, or 77%
The Control boy won in 7 pairs, or 23%

The Doña Elena *girl* won in 22 pairs, or 76%
The Control girl won in 7 pairs, or 24%

In the total 60 pairs the Doña Elena child won in 46 pairs or 77% in both height and weight.

By all three methods of comparison, then — the average gains in height and weight, the percentage of children making expected gains, and the number of children whose gains exceeded that of their partners — the Doña Elena children, both boys and girls, did better than the control group. This is clear evidence that there was significant improvement in the Doña Elena children that could reasonably be attributed to the nutrition program. Nevertheless, although the Doña Elena group gained more than the controls, and though many of the children made exceptionally good gains even up to 125 and 150 per cent of the expected, a considerable proportion of children did not do as well as they should. It is recognized that the "expected" gains used may be too high for Puerto Rican children. Since, however, the same standard was used for both groups the comparisons of the two would be valid.

Some Factors in the Failure to Make Expected Gains.

School Attendance. There are a number of explanations as to why the Doña Elena children did not make better gains. Chief of these is the poor record of attendance at school for most of the children and as a result the relatively few meals they had. The school year was from August 1 to May 29. But there was a Christmas vacation of two weeks, an Easter vacation of one week, and nine holidays that fell on school days. Moreover, relatively few children came to school the first week of each semester. These factors reduced the number of actual school days to about 165 or less. But attendance was poor even for these. Only a little over one-third of the group (37.4) were present on 80 per cent or more of the school days (36%, boys; 39%, girls). Another third (32%) had a record of 70 to 79 per cent attendance. The remaining third (31%) were present less than 70 per cent of the time. In terms of days this would mean that one-third of the children had about 125 to 130 days; one-third about 110 days and 14 per cent of them less than 80 days of schooling. (Table 22.)

The poor attendance can be attributed to several factors. Many children had to come long distances over steep hills and bad roads or only foot paths. It rained heavily most days during several months and the roads were deep in mud. Often when the children did arrive after this long, hard "trek" they found no teacher there and this did not tend to foster the idea that attendance was important. In the tobacco season some children, especially boys, were kept home to work in the tobacco. In some cases children's clothing had been washed and did not get dry in time for the children to come to school. All these are understandable reasons.

Number of School Meals Eaten. Poor attendance at school meant failure to be present at meals. (Table 20.) Lunch, as would be expected, had the best record; 39 per cent of the children were present for 80 per cent or more of the lunches served. Breakfasts were less good; only 30 per cent were present for 80 per cent or more of them. This low record was due to the fact that children came too late and had to go directly to their class-rooms. Suppers were the poorest meal. None were present for 80 per cent of the suppers served, though one-third (33%) were present for about three-fourths of them. Over one-third, however, were present for less than 60 per cent of the night meals. This poor showing for the evening meal was due largely to the late hour school closed and the desire of the children (or order from their parents) to return home before dark. Counting all meals, only 11 per cent of the children were present for 80 per cent or more, 39 per cent for about three-fourths, 20 per cent for about two-thirds, and 30 per cent for less than 60 per cent of them. It is seen that although theoretically the children were getting three meals a day for a total of at least 165 days, actually the number of meals eaten was far less than this for most of the children. The fact that even this limited number of meals resulted in gains in both height and weight greater than those for the control group is evidence that their previous diets had been inadequate, and that the meals at school had helped to promote better growth for the child profiting by them.

Loss of Weight During Vacations. That the home diets of most children were inadequate was borne out by the fact that a large proportion of them lost during vacation periods. During the Christmas vacation of two weeks 28 per cent of the children lost weight, during Easter week 41 per cent, and during the vacation month of July 73 per cent. In some cases the losses were slight but for others it was sufficient to off-set the gains for the preceding period. It was evident that the following year measures should be used to secure better attendance at school, and to work with the parents on having more regular and better meals for the children at home.

Parasites. It was suspected, and later confirmed, that practically all children were infected with parasites. The almost total lack of latrines and the habit of going barefoot meant constant exposure to hookworm and other parasites. It was not considered worthwhile to administer treatment for these until all families had latrines and the children provided with shoes and persuaded to wear them. So during this year we fed not only the children but a host of parasites.

In Home Food Production

The resurvey showed that there had been some increase in home produced food, though far less than had been hoped for.

Gardens. Of the 83 Doña Elena families, 36 now had a garden or at least some vegetables growing. Six of these had only two or three vegetables but 30 had real gardens with five to seven kinds of vegetables. The most common ones were lettuce, tomato, and cabbage but half of the gardens also had carrots, peppers, and string beans and 8 had chard. Most of the families were already eating the vegetables and liking them.

Fruit Trees. Of the fruit trees that had been distributed to the people the number of families in which the trees had survived and were thriving was: 78 acerola, 22 papaya, 19 lemon, 17 guava, and 14 orange. Though this was less than was expected, it nevertheless meant a total of 150 fruit trees more than there had been before.

Yellow Sweet Potatoes. Out of the 31 families that had received yellow sweet potato vines, 19 reported that the plants had died. But for 12 families they had grown and the families were eating the potatoes and liking them. This is 12 more than that had had them before. If these families continue growing them it will mean an improvement in their diets of at least one important dietary factor, Vitamin A, in which all the diets were lacking.

Cows. Nine families had obtained cows under the Department of Agriculture's plan for providing them for low income families. Most of the cows had already calved and were giving good quantities of milk. So at least these 9 families had an improved milk supply.

Chickens. The project for improving the breed of hens by exchanging fertile eggs from a good breed for those from local hens had been started late in the year. But 11 families had already received eggs, from which 134 chickens had been hatched. Only 71 of the chicks were, however, alive and thriving.

Rabbits. Twenty-seven rabbits had been distributed under the plan previously described. Of these, 25 were thriving and 9 had already produced 36 young. None were as yet old enough to be used for food.

These do not seem very impressive results for the home food production program. But they do at least represent some advance over the situation at the beginning. To have 36 gardens where there were none before, 150 additional fruit trees, 12 plots of yellow sweet potatoes, 9 better cows, and the beginning of a program for rabbits and better chickens; these are at least encouraging signs that with continued education much more may be accomplished in increasing the home production of foods by these families.

In Housing Conditions

Though emphasis on bettering housing conditions was begun late in the year some definite improvements had been made. These are summarized below in relation to the needs as indicated in the original survey for the 83 Doña Elena families:

Houses
  38 of the houses needed to be repaired or new ones built.
  8 families had built new ones.
Steps
  45 houses lacked steps.
  4 had been built.
Walk to house
  64 houses needed walks.
  7 had been built.

Kitchen
  77 families needed new kitchens.
  13 had been built.
Stoves
  77 families needed better cooking facilities.
  10 families had built cement stoves and 1 had a kerosene stove.
Storage
  78 families needed storage space in the kitchen.
  9 families had made it.
Drums and eaves
  80 families needed drums and eaves to collect rain water.
  62 families had them.
Latrines
  76 families needed latrines.
  73 families now had them.
Yard and surroundings
  64 of the surroundings were in need of cleaning.
  58 had made improvements.

These are encouraging results that give hope for more wide-spread improvements as the program develops during the following year.

In Community Facilities

Some outgrowths of the project were improvements in community facilities that were of benefit to all families:

1. The electric light line had been put in order and the families along the ridge now had electric lights. Others had been promised them soon. A few families had purchased refrigerators and a number had radios.
2. The roads to the area had been bull-dozed, both from Palomas and Naranjito through the cooperation of the mayors of the respective towns. Hard roads for both routes were in prospect.
3. The school had been improved:
    a. It now had a full day session instead of an interlocking one, with three teachers instead of two.
    b. A new-well-equipped lunchroom had replaced the small inadequate one, and children were being given three meals.
    c. The school-yard which after a rain had formerly been covered with mud and pools of water was now covered with gravel.

Interest and Attitude of the People.

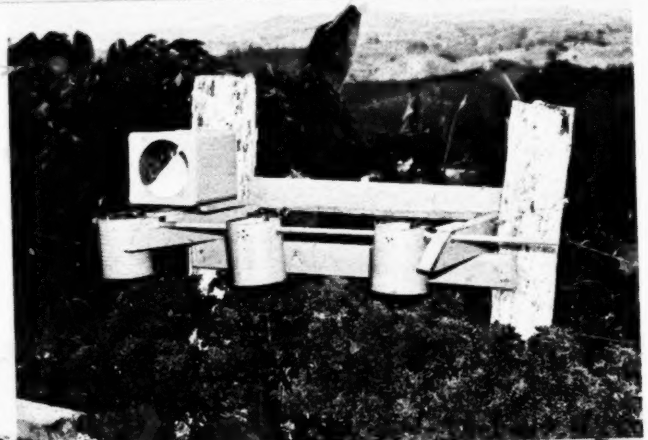
The preceding summary has been in terms of tangible results that could be observed and enumerated. But the most valuable results of such a program cannot be expressed in figures. They are better shown by the spirit and interest of the people. No attempt was made to measure these but it was evident to all observers that there was a general uplift in the spirit of the people, a pride in being a part of the project and an awakened desire to better their conditions of living.

PART IV

THE SECOND YEAR (1959-60) THE PROGRAM AND SIGNS OF PROGRESS

[redacted]

Figure 14—Device for hand washing with a minimum of water and soap. The first can at the right contains soapy water, the next one clean water. The one above contains pieces of paper towel.



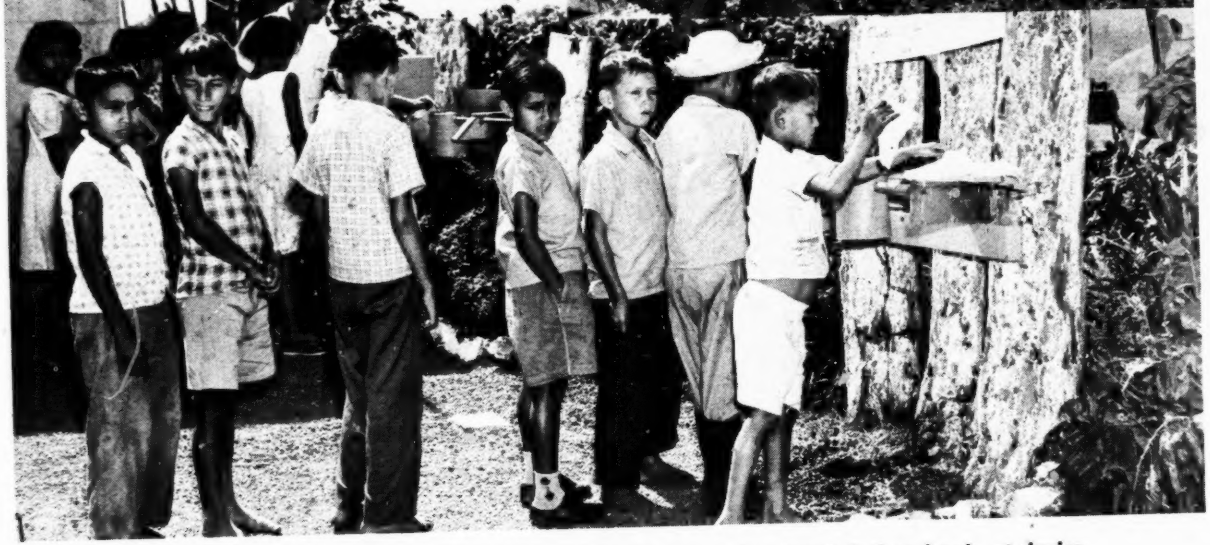


Figure 15—Children of the third and fourth grades washing hands before lunch, at device shown in Figure 14.

Figure 16—View of new lunchroom and children waiting their turn to enter after washing their hands.

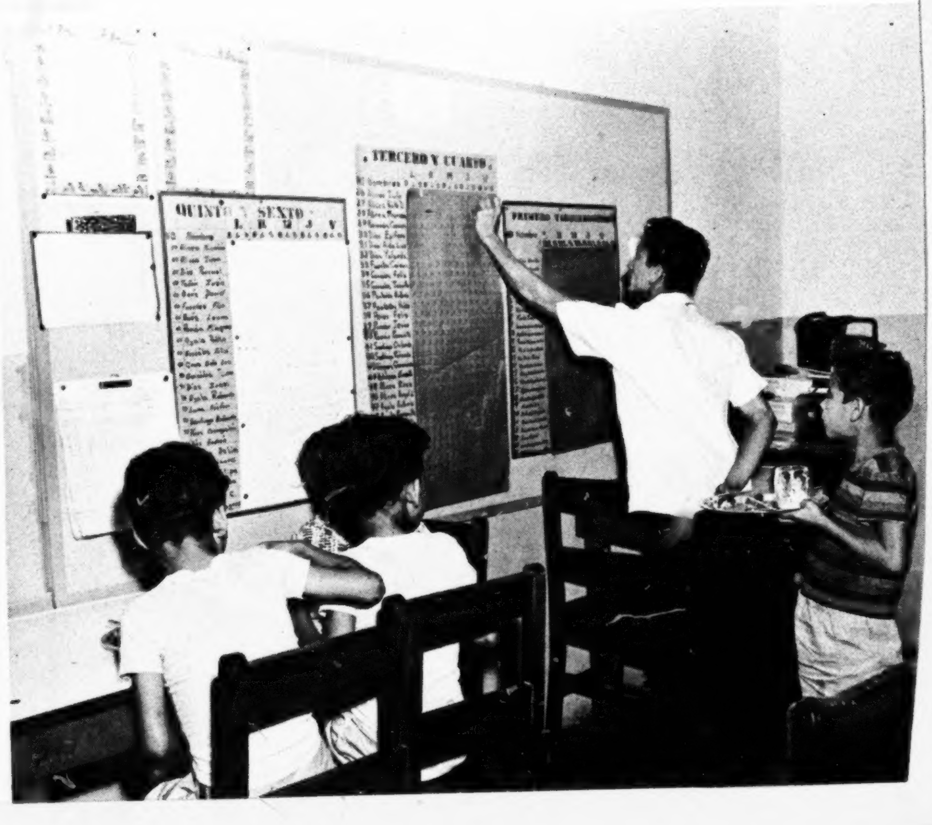


Figure 17—Teacher putting a star after the name of the child who stands by with his "clean plate."

PROGRAM FOR THE SECOND YEAR AND SOME OF THE RESULTS

The first year's work had revealed the needs of the people and aroused an interest in improving their conditions of living on the part of a significant number of families. The resident workers were now personally acquainted with every family in the area. They had visited them many times and knew their problems, their interests and their resources. The experiences of the first year had shown where changes in the program were needed and where new methods of approach should be instituted.

Stimulating Better Attendance of Children at School and at Meals.

If the growth of school children was to be a criterion of the effect of improved nutrition, it was evident that more regular attendance at school and at meals was essential. Several things were done to try to effect this.

Reports to Parents of First Year's Record. After the year's records were completed a summary was made for each parent for all his children. This included for each child his gains in height and weight together with his expected gains in each, his per cent of attendance at school and at meals, and his gains or losses in weight during vacation periods. Then followed a summary and recommendations. The workers took these summaries personally to the families and explained the records to them. They pointed out the relation of gains to attendance at school and at meals and to the losses during vacation periods when these occurred. The parents were much impressed as nothing like this had even been done for them before and they promised to try to have their children attend school more regularly.

Influence of Teachers. Two of the teachers were not returning the second year and this gave opportunity to select new ones with particular suitability for participation in the program. The Superintendent of Schools was asked to try to secure two teachers who met the following qualifications:

1. Were either University or Normal school graduates.
2. Had several years of experience, with a record of being good teachers.
3. Had a professional attitude toward their work.
4. Were interested in rural people and would enjoy working with them.
5. Would be willing to go to Doña Elena and become members of the project staff and work whole heartedly in it.

It was agreed that for such teachers the project would make substantial additions to their salaries. Two teachers were secured who met these qualifications as did also the one remaining from the previous year. These teachers soon justified the investment. With the help of the students they cleaned and painted the classrooms, cleaned the yard, planted shrubs and flowers, and made the surroundings attractive and inviting. They cleaned the latrines and painted them inside and out. They called parents to a meeting and discussed attendance and other matters with them. They visited the homes and became acquainted with the parents. They took charge of their children in the lunch-room. They devised a simple hand-washing-device so that children could wash their hands before meals. (Figures 14, 15, 16.)

From the standpoint of the feeding program one major contribution of the teachers was to stimulate better attendance. They did this by example, by emphasizing the importance of regular attendance to children and parents, and by doing real teaching that made coming to school worth while. At the end of the first semester the children who had had perfect attendance or nearly so were given certificates of honor at the Christmas program at which parents were present. The certificates were presented by the Superintendent of Schools who gave a brief talk on the importance of regular attendance and urged parents to try to have their children present every day. He also told them the date the next semester started and asked parents to send their children the first day, instead of letting them drift back a few at a time for a week or more as had been the custom.

The second semester a simple device that was initiated proved surprisingly effective. It was agreed that recognition of good attendance for shorter periods than a semester would be desirable. As an experiment on Friday afternoon each child who had been present every day during the week was congratulated by having the following ditty sung to him to the tune of "Happy Birthday to You."

"Felicidades a Juan	(Congratulations to John
Felicidades a ti	Congratulations to you
Asistencia perfecta	For perfect attendance
Felicidades a ti."	Congratulations to you.)

Each week more children were among the group saluted until sometimes practically all were included. When one mother learned of this ritual she said, "That explains why my child doesn't want to stay home any more!" One father also commented, "They don't have as many pains in the stomach in the morning any more."

Through all these efforts school attendance was markedly improved. The first year, it will be recalled, only 37 per cent of the children were present for as many as 80 per cent of school days. The second year this percentage was more than doubled as three-fourths of the children (77%) had attended 80 per cent or more of school days. Indeed in the second semester 42 per cent of the children were in attendance 95 per cent or more of the school days. At the other extreme nearly one-third of the children (31%) during the first year had records below 70 per cent attendance; in the second year only 4 per cent had this poor a record.

That not all children had good attendance is understandable since the bad roads, the rainy weather, the long trek to school, the need for children to help in the tobacco were still present. An appreciation of the problem was gained by the sponsors on the night of the Christmas program when they filled the jeep with some of the children and mothers who lived the farthest. After driving several miles up and down slippery, clayey hills and dropping the children and their mothers at the place nearest to their homes — with still a good distance for them to walk — they wondered, not why the children were often absent from school, but why they came as much as they did, especially the tiny seven-year-olds. But many persons eager to have an education have undergone worse hardships than these to attain it. Thus emphasis on regular attendance even under difficulties seems justified.

Changes in the Meals.

Since breakfasts and suppers during the previous year had had the poorest attendance, two changes were made to improve this. First the time for starting school was changed from 8:00 to 9:00 a.m. This made it possible for more children to be there in time for breakfast. Then instead of serving a cooked meal at night, which required three shifts in the lunch-room and thus made it late for the last group, a "snack" was served to all children in their own school-rooms just after school closed for the afternoon. This snack consisted of a hearty sandwich of meat, fish, or other protein, milk, and fruit. The milk was served plain, as cocoa, or flavored with peanut butter, molasses, or ginger as preferences of children indicated. The fruit used was a fresh one in season such as oranges, guavas, and bananas. The calories and other nutrients in this snack were equal to those in the hot meal but quicker service of it meant that more children received it. A record chart for children in each room was posted on the bulletin board in the lunchroom. At each meal the teacher checked the chart, putting a red star after the names of children who had a "clean plate." (Figure 17.) This simple device encouraged the children to eat foods to which they were not accustomed and to finish what they had been served. Care was taken to see that servings were suited to the size and appetites of children. (Figures 17-21.)

Higher Percentage of Meals Eaten and More "Clean Plates."

Better attendance at meals and changes in meal hours resulted in more school meals eaten by the children. (Table 20.) In the first year only 11 per cent of the children partook of 80 per cent or more of all meals served, now 76 per cent had such a record the first semester and 81 per cent the second. In fact, over half of the children (58%) were now present for 90 per cent or more of all meals served and less than one-fifth (19%) fell below the 80 per cent line as compared with 89 per cent that did the first year. There was not only better attendance at meals but more children ate all the food served them. In the second semester nearly three-fourths of all children (73%) now had clean plates for 80 per cent or more of the meals at which they were present as compared with only one-tenth (11%) that did in the first year. This improvement can be largely attributed to the fact each teacher now came to the lunch-room with his own children, was responsible for them during the period, and checked each child's record on the chart entering a star when all food had been eaten. Each teacher thus became familiar with every child. He knew when to urge a child to eat an unaccustomed food or to finish the food he had taken. He learned also to recognize when a child was not well and should not be expected to eat much. The result was a marked improvement in the eating habits of children as well as in all aspects of the lunchroom.

TABLE 20. PERCENTAGE OF; A. ATTENDANCE OF CHILDREN AT MEALS SERVED, AND B. OF CHILDREN HAVING "CLEAN PLATES" ON DAYS THEY WERE PRESENT. (SECOND YEAR, 1959-60). COMPARED WITH FIRST

Per Cent	First Year %	Second Year 1st Semester %	Second Year 2nd Semester %
A. Attendance at Meals*			
80 and over	10.7	75.6	81.0
95 and over	—	28.0	39.2
90 to 94	—	25.6	19.0
80 to 89	10.7	22.0	22.8
Less 80	89.3	24.4	19.0
70 to 79	39.3	13.4	16.5
Less 70	50.0	11.0	2.5
B. Clean Plates on Days Present			
80 and over	10.7	25.5	73.4
90-100		8.4	49.4
80-89		17.1	24.0
Less 80	89.3	75.4	26.6
70-79	39.3	24.4	17.7
60-69	20.2	18.3	5.1
50-59	16.0	11.0	1.3
Less 50	13.8	20.8	2.5

**Number of children, 82 first semester, 79 second. Total meals 273 first semester, 280 second.*

Nutrition Course for Teachers.

In the belief that nutrition teaching to children in the grades is best done by their own teachers, a course was given for the benefit of the three Doña Elena teachers. At the request of the Superintendent of Schools it was offered at Comerío so that other teachers might also attend. The course was taught by a member of the Home Economics faculty of the University of Puerto Rico from nine to twelve o'clock each Saturday morning for a full semester.* Twenty teachers were enrolled in the class, most of them rural teachers. During the first half of each period they were given a short course in the basic subject matter of nutrition; the needs of the body for the various nutrients, and how they could be supplied by every-day foods. This was a background for the teacher himself. The second half of the period was devoted to methods and materials for teaching nutrition to children at the various grade levels. It was emphasized that children should be taught in terms of foods — milk, meat, vegetables, fruits — and meals, not in terms of nutrients. Lessons for teaching these were developed and groups of children were brought in for demonstration. The effectiveness of the course was evidenced in the Doña Elena teachers who began at once to apply it in their own class-rooms.

**Ruth Fogleman*

Parasite Control.

About the middle of this second year a real attack was made on the problem of parasites since most of the families had now been supplied with latrines. A medical nutrition consultant and a nutritionist from the Department of Health planned and carried out a parasite control program for all families in the area with the cooperation of the resident workers. The two resident home economists labeled boxes for excreta for each person in every family and sent them home by the school children with instructions for collecting samples of excreta and returning them. By this means samples were obtained from a large proportion of persons in the area. Examinations of the excreta were made in the laboratories of the Comerío Department of Health. The results revealed a high incidence of infestation with hook-worm and other parasites. Treatment was given to infected persons to rid them of the parasites. Rechecks were made later and further treatment given to those in which parasites were still present.

Growth of Children the Second Year.

The group of school children was not entirely the same as the first year. Some had finished the 6th grade and others had entered the first. Only 65 children had been there the two years. The control group had also changed and it was not feasible to assemble those remaining for weighing and measuring. The growth data presented in Table 21 are for all Doña Elena children present during the second year. Since no growth standards are available for Puerto Rican children comparisons were made with the Baldwin-Wood standards for annual gains in height and weight for short children.

Height. The annual "expected" gain in height by the Baldwin-Wood standard is two inches for children of the ages in this group. Since the Doña Elena school year was ten months, the proportional part of two inches, or 1.67 inches, was considered 100 per cent of the expected. The average gain for the entire group was 1.88 inches or 113 per cent of the expected. When gains of individuals are considered, two-thirds (64.6%) of all children gained or exceeded their expected amounts (boys, 49%; girls, 83%). It may be of course that the standard is too high for Puerto Rican children. If we include all that gained 90 per cent or more of the "expected," then 81 per cent of them are at or above this level, 72 per cent of the boys, 92 per cent of the girls. A significant proportion of the children made exceptionally good gains in height. Nearly half of the group (45.6%) gained 10 per cent or more than the expected and more than one-fourth (27.8%) exceeded it by 20 per cent or better, 12 per cent of them by 50 per cent or more. For girls the record is even better. Two-thirds of them (66.7%) gained 10 per cent or more than the expected amount and 42 per cent of them exceeded it by 20 per cent or over.

Weight. Expected gain in weight according to the Baldwin-Wood standard varies with age and sex. For the early years it amounts to 4 to 5 pounds a year, but in pre-adolescence it increases to 10 to 12 pounds or more. Each child's gain was, therefore, individually assessed according to his age and sex. This was done with some misgivings at the upper age levels where the annual gains show a sudden large increase from one age to the next in the period of accelerated growth. For girls it jumps from 6 pounds at 11 years to 10 pounds at 12 years; for boys from 9 pounds at 13 years to 11 at 14 years. To use these norms for an 11-year-old Puerto Rican girl, or a 12-year-old boy might do them an injustice since their period of acceleration might be later and the gain for the previous year be normal for them. Fortunately relatively few of the children fell in this older group. In any case since these were the only standards available the norms given in them for short children were used as a criterion of growth progress.

By this standard 80 per cent of all children gained the expected amount in weight for their age and sex (boys, 72%; girls 88.8%). (Table 21.) If we include the group that gained 90 to 99 per cent of the expected then 86 per cent of all children are included in this group; 79.1 per cent of the boys, and 94.4 per cent of the girls. What is more significant is the unusually good gains made by a large proportion of the children. Over half of all children (58.2%) made gains 20 per cent or more above the standard, more than one-fifth of them (21.5%) exceeded it by 50 per cent or more. For girls the record is even better. Over two-thirds of them (69.4%) exceeded their expected gains in weight by 20 per cent or more, one-fourth of them (25%) by 50 per cent or better.

TABLE 21—PERCENTAGE OF EXPECTED GAINS IN HEIGHT AND WEIGHT FOR DONA ELENA CHILDREN FOR SCHOOL YEAR, 1959-60.*
(SECOND YEAR)

Per Cent	Total %	Boys %	Girls %
A. Height*			
100 or more	64.6**	48.8	83.3
120 or over	27.8 } 45.6	18.3 } 28.9	41.7 } 66.7
110—119	17.8	10.6	25.0
100—109	19.0	19.9	16.6
Less 100	35.4	51.2	16.7
90—99	16.4	23.3	8.4
80—89	10.1	16.3	2.8
Less 80	8.9	11.6	5.5
B. Weight			
100 or more	79.7	72.1	88.8
150 or over	21.5 } 58.2	18.6 } 48.9	25.0 } 69.4
120—149	36.7	30.3	44.4
100—119	21.5	23.2	19.4
Less 100	20.3	27.9	11.2
90—99	6.3	7.0	5.5
80—89	1.3	2.3	—
70—79	2.5	2.3	2.9
Less 70	10.2	16.3	2.8

**Expected gain for 10 months, 1.67 inches. Average gain, 1.88 inches or 113%. (Boys 103%; Girls 122%.)*

***If 90 per cent or more of the American standard is taken as normal Puerto Rican children, then 81 per cent of all children would be classed as making expected gains; 72% of boys, 92% of girls.*

Although these gains in height and weight could not be compared with those for control partners as in the first year, the large proportion of children that exceeded "expected" norms by significant amounts may be regarded as evidence of the beneficial effects of the program on the nutrition of the children.

Other Signs of Improvement.

There were other signs of improvement not susceptible of tabulation. These were shown by the attitude and behavior of the children. They were more alive, alert and active and more interested in everything and everybody. Persons who had seen them at the beginning and again at the end of the two years were amazed at the change that had taken place. Instead of the former apathetic group of stolid, indifferent children there was now a lively group of alert and happy youngsters such as could be found in any school in a more economically favored community.

New Emphasis on Home Food Production.

Gardens. Though some increase in gardens had been attained in the first year, it was far from what was needed. It was decided that less emphasis this second year would be put on having a separate garden plot and more on planting specific things. Though a special garden plot may be more desirable, it requires devoting a special place and time for it and both are felt to be needed for the tobacco. But planting some sweet potato vines or calabaza seeds among the plaintain or a row of peppers, tomatoes or lettuce along the edge of a field prepared for a main crop would require little time and no special preparation of space and yet yield goodly amounts of vegetables. Though gardens as such were still urged for all who could have them, the alternative of planting vegetables in any available space was also advocated.

The results were rewarding. Of the families revisited 64 (83.5%) had now, or had raised some vegetables. Some of them had only one or two kinds, but others had 3 or 4 kinds, and a few even five or six. The most common vegetables planted were lettuce, tomatoes, peppers, and beans. The total number of families having different vegetables was in decreasing order; peppers, 60; lettuce, 59; tomatoes, 58; beans, 32; cabbage, 16; carrots, 13; chayote, 10; eggplant, 8; okra, 5. It is gratifying to find that the vegetables that head the list are all nutritively valuable. Carrots, cabbage and okra could well have a higher place, but chayote and eggplant are where they belong, at the bottom of the list.

Yellow Sweet Potatoes and Calabaza. From the outset the growing of yellow sweet potatoes and calabaza had been promoted in order to insure a more liberal source of vitamin A in the diets. No families had yellow sweet potatoes at the beginning of the project; at the end of the first year 12 families reported having grown them. At the end of this second year this number was doubled; 24 families or 31 per cent now had grown them, eaten them, and liked them. Calabaza shows an even better record probably because families are accustomed to using it to some extent. At the time of the re-survey 48 families (61%) had it growing. The goal which was set of "a row of yellow sweet potatoes and 2 to 3 plants of calabaza for every family," however, still falls far short of being met.

Fruit Trees. The fruit trees introduced the first year were acerola, lime, papaya, and an improved type of guava. Not all trees had survived, but 27 families still had papaya, 23, guava, 32, lime and 49 acerola. Acerola, it is seen, thrived best; 65

families received them and 47 still had one or more, making a total of 107 in the area. At least 7 families have already had fruit from their trees and eaten it. The goal is to try to insure that each family has at least acerola, papaya, orange, and grapefruit or lime or both. These, together with the guavas growing wild and the ripe bananas that all could easily have, would furnish a year-round supply of fruits rich in Vitamin C and other valuable nutrients. They would also add flavor and attractiveness to the diets.

Chickens. The plan for exchanging fertile eggs for these from native hens had been only moderately successful. Finally it was decided to buy a small incubator, hatch the eggs and make live chicks available to families either by purchase or exchange of eggs. Then hens and incubator were taken to the school and put in charge of the 5th and 6th grade children and their teacher. This served as an educational activity for the children as well as a source of enjoyment. But unfortunately the proportion of chicks hatched was too small—probably due either to a defective incubator or to irregularity of the electric current—and this method had to be abandoned. Nevertheless, by the two methods some progress has been made. Over one-fourth of the families (28.6%) had at least a start on a better breed. Some families had only a few hens but 3 or 4 families had flocks of 15 to 30 or more. There was a total of at least 241 fowl of good breed in the area. The encouraging aspect is that many other families were now interested in having them and the problem was how best to help them to secure them within the limits of their income.

Improvement in the Diets of Families.

The Breakfast Program. The fact that many children lost weight during vacation periods of the first year indicated that more emphasis should be put on education of women in their homes in the better feeding of their families. Since breakfast in the majority of families consisted mostly or entirely of coffee it was decided to start a better breakfast program. A lesson-demonstration was prepared on why breakfast is important and what makes a good one, and a leaflet summarizing the main points was prepared to leave with the housewife. Then the home economists gave the demonstration to the house-wives in every area. They gave it to groups that could be assembled and, when necessary, to women in individual homes until every house-wife had been reached. Follow-up visits were made to see that the lesson was effective.

The results were encouraging. In the original interviews 70 per cent of all families had only coffee for breakfast and in 15 per cent it was black. In the re-survey the second year this proportion was reduced to 39.8 per cent having nothing but coffee and only 7 per cent having it black. The first year about one-fourth of the families (23%) had a cereal with their café con leche; now over double that number (47.0%) had one. In the majority of cases (25%) this was a cooked cereal, nearly always oatmeal or corn meal, the ones on which emphasis had been put in the demonstration. It was gratifying to find that the better breakfast program had had some effect.

Other Meals. The need for improvement of other meals was stressed in the visits of the workers to the homes and in also the home food production program whose purpose was to increase the amounts of protective foods in the diets of the families. For the families that had grown garden vegetables and had raised sweet potatoes and calabaza and eaten them, the diets were improved at least during that period. So also were those of the few families that had better cows and chickens. Electricity in the area meant that the small stores had refrigeration and could keep fresh meat and other perishables for families that could afford to buy them. All these must have made substantial additions of essential nutrients to the diets of a significant number of families, at least for a period.

The diets of families as obtained in the re-survey reflected some of these influences. Fewer lunches consisted of viandas only than in the first year (2 vs. 22%), more contained codfish (51 vs. 43%) and more also had another protein food (24 vs. 14%). Fewer suppers likewise consisted of only rice and beans (40 vs. 65%) and more of them contained a protein-rich food (36 vs. 25%). Of the protein foods eggs showed the greatest increase in use. Over half of the families (54%) now reported having them 2 to 3 times a week or oftener as compared with 48 per cent the first year and only 34 per cent as having none as compared with 47 per cent the first year. A somewhat larger percentage of families also averaged a pint of milk or more per person (41.4 vs. 33%), but a larger proportion also fell in the group having none or less than 8 ounces (31 vs. 22%).

It is apparent from the above that no great changes have taken place in the dietaries of these families. Nevertheless, some small progress has been made. The hope for greater improvement lies in even more emphasis on the home food production program.

Non-nutritional Aspects.

Continued emphasis was given to non-nutritional aspects of the program started during the first year. The interest in better kitchens and cement stoves that had been aroused toward the end of the year was capitalized on and the program for building them pushed with vigor. Efforts were made to extend electricity to other sections and to secure latrines and drums for water for more families. The needs for better and larger houses, for cleaner surroundings, for a better water supply, and above all for better roads were all recognized and movements toward trying to solve them were under way.

The community council which had been set up during the first year began to assume more initiative and leadership during this second year. The council was composed of a leader chosen by the people from each of the five areas. These leaders took their appointments seriously. They took the lead in all matters relating to roads and other all-community problems and worked closely with the local workers and the sponsors on all aspects of the project.

Housing. Some improvements were made by families in housing and in some of its adjuncts. Twenty of the families (24.1%) had built a new house and 38 others (45.7%) had made some repairs. Others had made some improvements; 26 families (31%) had painted their houses, 20 had built needed steps and 9 had either added a room or divided the bedroom to make two sleeping rooms. There was now a felt need on the part of many families for better housing. Some of the new houses were small and regarded only as temporary, others were in need of added rooms, and a considerable number ought to be replaced by new and larger ones. At the end of the year a movement was under way for a cooperative house-building project under the Social Programs Administration.

Improved Kitchens and Cooking Facilities. The program for building cement stoves which began toward the end of the first year and resulted in 11 cement stoves. This movement gained impetus and at the end of the second year 39 families or 47 per cent now had them. Another 32 families had secured a kerosene stove and two "gas fluido." This makes a total of three-fourths (74.7%) of the families that now had smokeless cooking facilities as compared with 6 per cent that did at the beginning.

Since building a cement stove nearly always required a new kitchen the result was that 48 new kitchens were built, and 9 others were repaired. Thus two-thirds (68.7%) of the families now had better kitchens. These kitchens, it must be noted, bear no resemblance to the modern idea of a kitchen. But they do have a stable foundation that will support a cement stove and solid walls and floors. Practically all of them, moreover, now had at least one small cupboard made from a box to hold dishes or cooking utensils. Simple as these changes may seem, they constitute a great improvement over conditions at the beginning.

Cleaner Surroundings. Nearly all families had done something to improve the surroundings of their homes. Most of them (95%) had at least cleaned the patio of rubbage and two-thirds of them (66.1%) had planted some shrubs or flowers. One-third (35%) had built a walk to the house, 14 families (17%) had dug a pit in which to bury garbage and three families had planted grass in the yard. Of course surroundings do not stay clean, and the habits of a lifetime cannot be radically changed in a short time. But the appreciation of cleanliness is gradually being developed at least among a significant number of families. This is illustrated by a remark made by one man as he looked around the kitchen in the project house. "What a lot of difference cleanness and a little paint makes," he remarked. Then he turned to Carmen and said, "Do you know what I always think when I see you coming? I think, 'Are we clean?'"

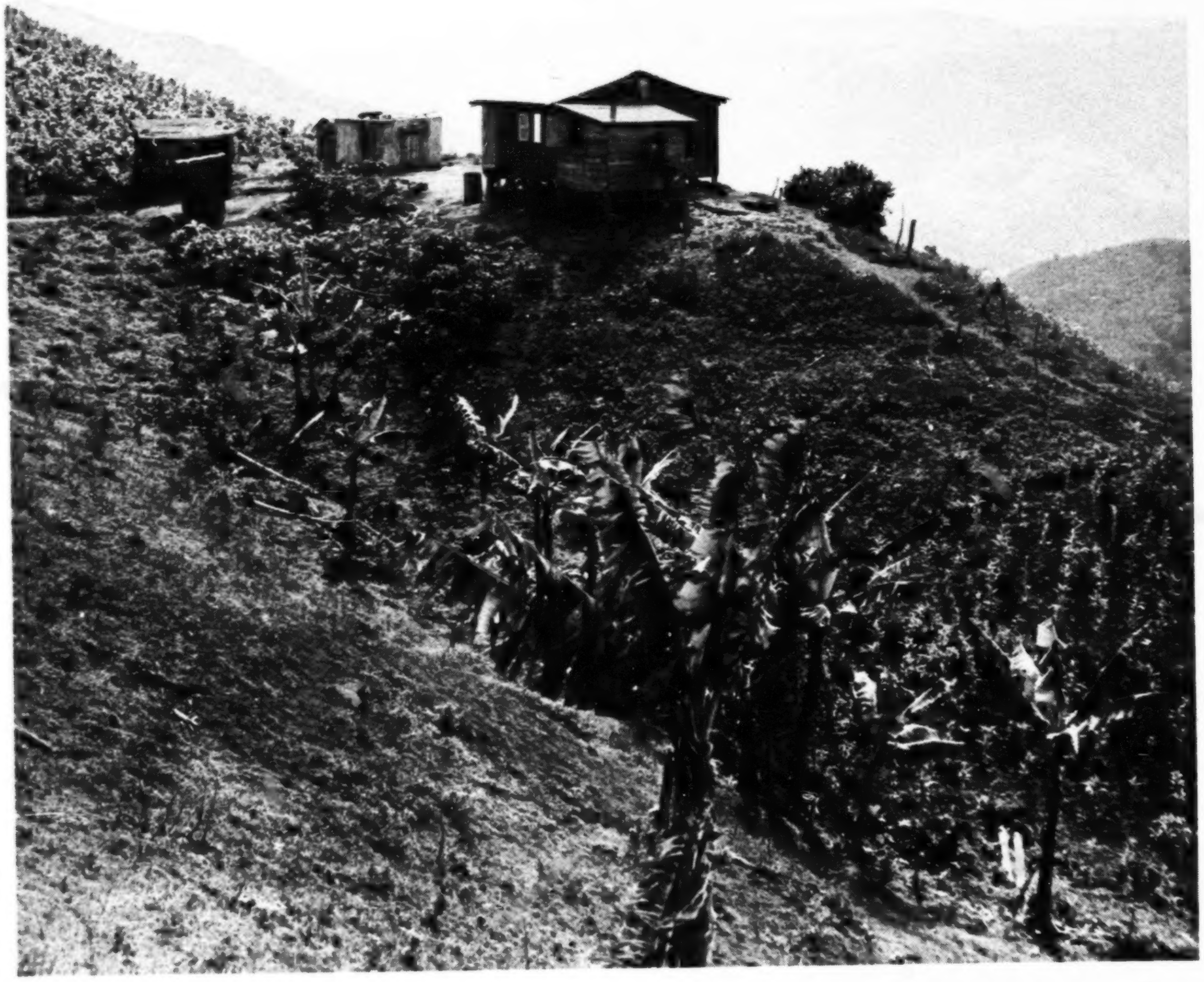
Latrines and Drums for Catching Rain-Water. At the beginning of the project only 5 families had latrines. Now 70 families or 84% had one. Those that lacked them were the new families that were not there when latrines were provided. These families use latrines of neighbors but should be supplied with ones of their own.

At the beginning 80 of the 83 families had no drums or tanks for catching water from the roof. At the end of the second year 65 families or 78.3 per cent of the total had been supplied with them. Toward the end of this year a movement was initiated by the leaders to investigate the possibility of piping water to at least one section where it would benefit some 30 to 40 families.

Electricity and Electric Appliances. Largely through the efforts of the community leaders electricity had been extended to another section so that one-half of the families (53%) now had it. The school lunchrooms were also wired and lights installed. Plans were under way to extend the system to another section. Electricity means not only the convenience of lights in the homes but also the possibility of having electric appliances. The two most common ones observed were the electric flat-iron and radio each of which was found in 36 homes (43%). In addition 7 families had a refrigerator, 6 had television and one family a washing machine. The high cost of refrigerators prevents more families from having them and the cost doubtless also explains why some families with electricity do not even have electric irons.

Roads. Through the efforts of the leaders and local workers in securing the cooperation of the mayor of Camerio, the road from Palomas had been bull-dozed to remove the ruts. A road was also bulldozed into a section where one-fourth of the families live which was formerly reached only by a footpath. Under a program of Community Education a hard road had also been built part of the way in from Naranjito with the promise of its being extended.

Figure 18—Close-up of house. Note improvements: New kitchen with smokeless stove, steps, drum to catch rain water, latrine, shed for new cow, road to house.



PART V

STATUS AT THE END OF THE FIFTH YEAR

STATUS AT THE END OF FIVE YEARS

The preceding sections have described in some detail the programs followed for each of the first two years and some of the results that were observed. The work has continued along similar lines during the following three years with such modifications as have seemed indicated as the work has progressed. This section will report the progress that has been made in the various lines of activity since the project started, and the status at the end of five years. It will also suggest the lines of work indicated for the future and will describe briefly the most important outcome of the project which has made it possible to extend similar programs to other isolated communities.

Changes in the Community

In the Families.

There have been some changes in the community during the five years. Some families have left the community, especially during the earlier years, and others have moved in. Young people of the community have married and made homes of their own in the area. As the result of these changes there are now 90 families included in the project. Of these, 71 families are of the original group of 83 with which the program began and 12 are offspring of these that married and settled in the area. These 83 families may thus be considered as having been under the influence of the project most or all of the five years. The other 7 families have come to the community within the past two or three years.

Size and Age Composition of Families.

These 90 families include 663 persons, or an average of 7.4 per family. This is close to the average of 7.3 found for the 100 families in the first survey. The distribution as to size, however, varies as summarized below:

No. of Members	90 families (1963) %	100 families (1958) %
Less 6	36.7	36.0
6 to 9	41.1	36.0
10 or more	22.2	25.0

Families with less than 6 members are about equal in the two groups, but the present group has more families of 6 to 9 members and fewer with 10 or more. This means there is now somewhat less house-crowding than in the earlier study in which 46 per cent of all persons were living in house-holds of 10 or more. Nevertheless, 259 persons, or 39 per cent of the total are still living in house-holds of 10 or more members, and 149 of them, or 22 per cent, in ones of 13 to 20. Some of these large house-holds actually consist of two or more families, usually of sons or daughters or both, that have married and are living with their parents.

The age distribution of individuals in the present group likewise varies to some extent from the earlier one, as shown in the age-distribution for all persons in 1958 and 1963 as shown below:

Age	1963 (%)	1958 (%)
Under 6	20.8	20.8
6 to 9	12.8	14.9
10 to 12	8.7	10.4
13 to 15	11.1	9.2
16 to 21	10.4	10.4
21 and over	36.2	34.3

For children under 6 years of age and those of 16 to 20 years, the percentages are identical, but the present group has fewer in the ages of 6 to 9 and 10 to 12 years, and more in the 13-15 year range. It also has a somewhat larger proportion of adults 21 years of age or more.

Income.

According to the estimates made by the families of their incomes for the preceding year, over half of them (56.7%) had less than $1,000, over one-fourth (29.7%) had from $1,000 to $1,999, 13.6 per cent had $2,000 or over and 7.4 per cent had $3,000 or more. Most of those with the highest bracket are house-holds consisting of two or more families and the income represents that of several bread-winners.* These incomes are markedly higher than those found for the 100 families in 1958 (Table 6). The two groups are, of course, not identical except for about three-fourths of the families. Nevertheless the differences are large enough to indicate that there has been some improvement in the general level of incomes in this area during the five years. The fact remains, however, that at least half of the families are still subsisting on incomes too low to maintain a satisfactory standard of living.

THE NUTRITION PROGRAM IN THE SCHOOL

Improvement in the School, Attendance, and Meals Eaten.

The school, as has been shown in earlier sections, is quite a different place from what it was when the project began. Now there is a full-day session for all children, with three teachers participating actively in the program. The quality of teaching has improved, the school-rooms are attractive and inviting, the surroundings are clean and planted with shrubs and flowers. There is a new, larger, well-equipped lunch-room and hand-washing facilities in the yard. The teachers are responsible for their students in the lunch-room and are helping them to establish good food habits.

Attendance at school has steadily improved over the years. As shown in Table 22, during the first year of the program only 37 per cent of the children were present 80 per cent or more of the school year. The next year this percentage had risen to 77 per cent and the third year to 83 per cent. Indeed, in the third year 52 per cent of the children had a 90 per cent record of attendance or better and one-fourth of them (26%) were present 95 per cent or more of school days. School attendance is no longer a problem.

**One family with $6,000, for example, consists of three families: two married sons with their families live in the household and a daughter is also employed. Thus four bread-winners contribute to the $6,000. Several others of the higher incomes are earned by men working in the States.*

TABLE 22. IMPROVEMENT IN SCHOOL ATTENDANCE FOR THREE SCHOOL YEARS (AUGUST 1958-MAY 1961)

	1958-59	1959-60		1960-61
		1st Semester	2nd Semester	
	%	%	%	%
80 and over	37.4	74.4	77.2	83.3
90-100	—	26.6	41.7	26.4
90-94	1.1	26.8	15.2	26.4
85-89	17.6	11.0	8.9	20.8
80-84	18.7	10.0	11.4	9.7
Less 80	62.6	25.6	22.8	16.7
70-79	31.9	12.2	19.0	9.7
60-69	16.4	10.0	2.5	7.0
50-59	6.6	2.3	1.3	—
† Less 50	7.7	1.1	—	—

**Number of children; first year 91; second year, 82 first semester, 79 second; third year 79.*

Better attendance at school and the attention of the teachers to their students have resulted in a marked increase in the number present at meals, in the attitude of children toward unaccustomed foods, and the extent to which they eat the foods served. The first year only 11 per cent of the children were present for 80 per cent or more of the meals served. In the second year this proportion had risen 73 per cent and in the third year to 81 per cent; more than half of the group were present for 90 per cent or more of all the meals served. This high level of attendance at meals has continued. The failure to reach a more perfect record is due largely to the youngest children who, because of the long distance many of them travel and the heavy rains at some seasons, cannot attend as regularly as the older ones.

"Clean Plates" have now become the common occurrence for most of the children. This was not the case at the outset. During the first year only 11 per cent of the children ate the food served them for 80 per cent or more of the meals at which they were present. They pushed aside unaccustomed foods, picked pieces of carrots out of their stew, and left milk in their glasses. The second year after the teachers began bringing their own students to the lunch-room and being responsible for them, the 11 per cent had risen to 26 per cent the first semester and to 73 per cent by the second. From this time on, the proportion had increased until 90 to 95 per cent of the children now eat all the food served them at the meals at which they are present. The proportion is practically 100 per cent in the upper grades. This has been accomplished in part by regulating portions to the size and appetites of children, but more especially by the attention of the teachers to their own students.

Changes in Students, Teachers, and Other Workers.

There have been changes in the students, teachers and workers during the five years. Each year 6th grade children have left, new first grade ones have entered and others have moved up grade by grade, till now there are left only a few children in the sixth grade that have been there since the beginning. The teachers too have changed as shown in the diagram below. It is seen that nine different teachers

Diagram Showing Continuity of Workers

	Year				
	1st	2nd	3rd	4th	5th
Teachers Grades 1-2	←M.O.→	←M.M.—	—M.M.→	←A —	—A→
" 3-4	← J.G. —	— J.G.→	←W.S.→	←B —	—B→
" 5-6	← E.C. →	←F.G. —	—F.G.→	←C —	—C→
Lunch Manager	← S —	— S —	— S —	— S —	— S→
Home Economist	← Ca —	— Ca —	— Ca →		
			←	—H —	—H→
Agronomist	← Al —	— Al ⇄	— An —	—An—	—An→

have been in charge of the three groups during the five years, and that all but three of them have been there for two consecutive years. There was sufficient over-lapping of these during the first three years to provide a stable program for this period. At the end of the third year, however, all three teachers left and a new group took their places. These teachers were chosen for their suitability for, and interest in, the project. They were oriented regarding the objectives and procedures of the program and are now trying to carry it on as before. Nevertheless, the complete change of teachers caused a temporary break in the program. Fortunately the lunch-room manager and most of the workers have been with the project for the full five years and have maintained the standards in this area.

The community workers, as seen in the diagram, have provided an unusually continuous group. The home economist who started the program remained with it for three years. When she left for a year of advanced study her work was continued by one who had been working with her for several months. The original agronomist also continued for two years and was then replaced by his brother whom he had in training several weeks before leaving, and to whom he was thereafter available for counsel and help. The same policies, procedures and standards have thus been maintained throughout the five years.

Growth of Children

The First Two Years.

During the first year the effect of the nutrition program on the growth of Doña Elena children could be assessed by comparison with that of a closely matched control group. The growth of the Doña Elena children was found to be better than that of the controls by three methods of appraisal. (1) The average gain of Doña Elena children exceeded that of the controls by an amount equal to one-third of a year's expected gain in both height and weight; (2) Twice as large a proportion of Doña Elena children made their expected gains as did the controls; and, (3) in 46 of the 60 closely matched pairs, or 77 per cent, the Doña Elena partner made the best gains. It could be concluded from these results that the nutrition program had had a favorable influence on the growth of the children of the project.

The second year progress was assessed only by the percentage of expected gains made by all school children. In height 81 per cent of all children gained close to or above their expected amounts, and for weight 87 per cent met this standard. More significant is the large proportion of children that made exceptionally good gains. In height, 46 per cent of the children exceeded their expected gains by 10 per cent or more, 28 per cent of them by 20 per cent or more. In weight, 58 per cent gained 20 per cent or more than their norms and 20 per cent exceeded them by 50 per cent or over. Only 19 per cent of the group failed to gain their expected amounts and only 13 per cent failed to do so for weight.

Growth of 25 Matched Pairs Over a Three-Year Period.

At the end of the third school year there only were 47 of the original matched group still in school. It was decided to make a special effort to locate as many as possible of the original control partners for these and obtain their height and weight measurements, and to compare the growth of the two groups for the three years. A nutritionist from the Division of Nutrition of the Department of Health (Nexy Quinones) undertook this task. With the cooperation of the Superintendent of Schools in the control area, she traced the children now in school to the one they now attended and with portable scale and measuring rod went to the various schools and weighed and measured all children she could locate. Unfortunately only 25 of the control group could be found. This is too small a group to be of great significance. Nevertheless, since the 25 children were well matched with 25 Doña Elena children at the beginning in 1958, it was deemed worthwhile to compare the progress of the two groups for the three years. The findings are summarized in Table 25.

TABLE 25. GAINS OF 25 MATCHED GROUPS OVER A THREE-YEAR PERIOD

	Height inches	Weight lbs.
A. Total and average gains		
Doña Elena	162.35	430.85
Controls	151.05	411.10
Difference	11.30	19.75
Av. / child	0.45	0.83
	Height %	Weight %
B. Partner Making best gains		
Doña Elena	64	68
Controls	36	32
	Total inches	Av./ Child
C. Excess over expected gains in height		
Doña Elena	20.35	0.81
Controls	9.1	0.32

Looking first at the gains in height it is noted that the Doña Elena children had gained 162.4 inches in the three years, the control children 151.1 inches. Thus the gains of the 25 Doña Elena children exceeded those of the 25 controls by 11.3 inches, or an average per child of nearly one-half inch (0.451). The "expected" gain in height for the 34-month period for the 25 children was 142 inches. The Doña Elena group exceeded this amount by 20.4 inches, or an average of 0.8 inch per child. This amounts to more than one-third of a year's expected increase(41%). The control group gained 9.1 inches over the expected, an average of 0.32 inch per child or about 16 per cent a year's expected amount.

In weight also the gains of the Doña Elena group exceeded those of the controls by 19.8 pounds, or an average of 0.8 pound per child. This is equal to nearly one-fourth of the annual average weight increase for children of these years.

When the gains of individual partners are compared, it is found that in 16 of the 25 pairs, or 64 per cent, the Doña Elena child gained more than his partner in height, and in 17 pairs or 68 percent he exceeded the gains of his control partner in weight.

Thus, by three methods of comparison—gains in height and weight, excess over "expected" gains, and the partner making best gains—the Doña Elena children made the better record. This agrees with the findings for the 60 pairs of 120 children that were present the first year. Though the final group was small, since they were well matched at the outset, these results help to confirm the findings of the earlier ones that the nutrition program has been a favorable factor in the growth of Doña Elena children over the three years.

PUBLIC FACILITIES

Water.

From the beginning water has been one of the major problems of this community. A large majority of the families carried all the water they used for all household purposes from some distance to their homes, in most cases over steep hills. Only a few homes had even facilities for catching rain water from the roof. During the first year the project directors encouraged the families to build eaves on their houses and helped them secure drums to catch the water. Practically all families now have at least this device, which reduces to some extent the number of trips up and down hill to carry water. Nevertheless, most of the families (89%) still have to carry much of the water they use, some of them for distances of a kilometer or more and usually over hills. Only a few (11%) have water in the house or near at hand.

Early in the third year, a project for building an aqueduct to supply water for part of the families was undertaken. The Group Organizer of the Department of Community Education took over the project and later in cooperation with the Rural Development program of the Extension Service at Naranjito enlarged it to include three communities, one of which was Doña Elena. The total project will benefit 250 families in the three areas; 80 of these are Doña Elena families. The school will also be included. The total estimated cost of the project was $73,000, of which $35,000 was for labor. Since the men of the community are doing the work this reduces the money cost to $38,000. The mayors of Comerio and Naranjito each contributed $3,000; the remaining $32,000 will be provided by a fund set apart by the government for aiding such self-help projects. The work is well under way. At the time of writing the pipes are being laid into the Doña Elena area. When completed the system will serve 80 per cent of the Doña Elena families. Hydrants will be placed at convenient locations along the roads. Individual families who can afford to do so will pipe the water to their homes, others will go to the hydrant for it. A fund for the maintenance of the project is already being collected and plans are being made for its care and management.

Safe water close at hand will be a great advantage to these families. It will reduce the exposure to water-borne diseases; relieve family members, especially children and women, from the hard and endless task of carrying water over the steep hills; and make water more freely available for household uses. This should be reflected in cleaner houses, cleaner clothing, and also in the personal cleanliness of individuals.

Electricity and Electric Appliances.

At the beginning of the project no homes in the area had electricity. Poles had been set and wires strung along the main road, but the system was faulty and unusable. During the first year this line was put into condition and electricity made available to a third or more of the families. Since then lines have been extended to other sections so that electricity is now available to 70 of the 90 families, or 78 per cent. Of these, 61 families have it in their houses; the other 9 have not taken advantage of it probably for economic reasons. Work is now under way in another section and it is in the plan of the Water Resources Authority to make electricity available to the entire community during the coming year. All families whose houses were wired soon had electric lights and nearly all of them an electric iron and radio; two-thirds of the families (64%) now have these. In addition 29 families (32%) now have refrigerators and 19 (21%) have television. One family also has a record player and one an electric sewing machine. If one has ever lived without electricity, it is easy to realize the great boon this is to these families and how it adds to the convenience and comforts of living.

Roads.

To the people of the community the greatest gain has been the improvement of the roads. This has been a gradual process over the four years. At the beginning they were mere trails over and around the hills, full of ruts and mud-holes and passable only by jeep. The first step in their betterment was made during the first year when the mayor of Comerio sent bull-dozers over the road to the school, and the mayor of Naranjito did the same for the Naranjito road to the junction of the two. Even this step improved conditions materially at least for a short period. During the next two years the mayor of Comerio built a hard road to the junction of the Naranjito one, and the Naranjito portion was also paved under the auspices of the Community Education program. Thus about half the distance to the school could now be travelled by car over a hard road. Even this seemed a luxury indeed. But there still remained several kilometers of the worst part of the way that had to be negotiated in a jeep, or by foot. This was the status when the Commission for Improvement of Isolated Communities, as described later, was established. One of the first acts of the Commission was to allocate $50,000 for the completion of the road to the school. That road is now completed and the sponsors have had the thrill of driving on it in a car directly to the school house over the same trail they had so many times jolted in a jeep and even trudged several times by foot. (Figure 18 and 19.) But to the people in the community the road means much more. It is a dream come true and a day-to-day blessing, for it will make a vast difference in the conveniences and satisfactions of living. It will facilitate getting products to market and needed supplies to the community. It will mean easier access of people to town, to health facilities, to meetings, and of children to school. The community will no longer be an isolated one.

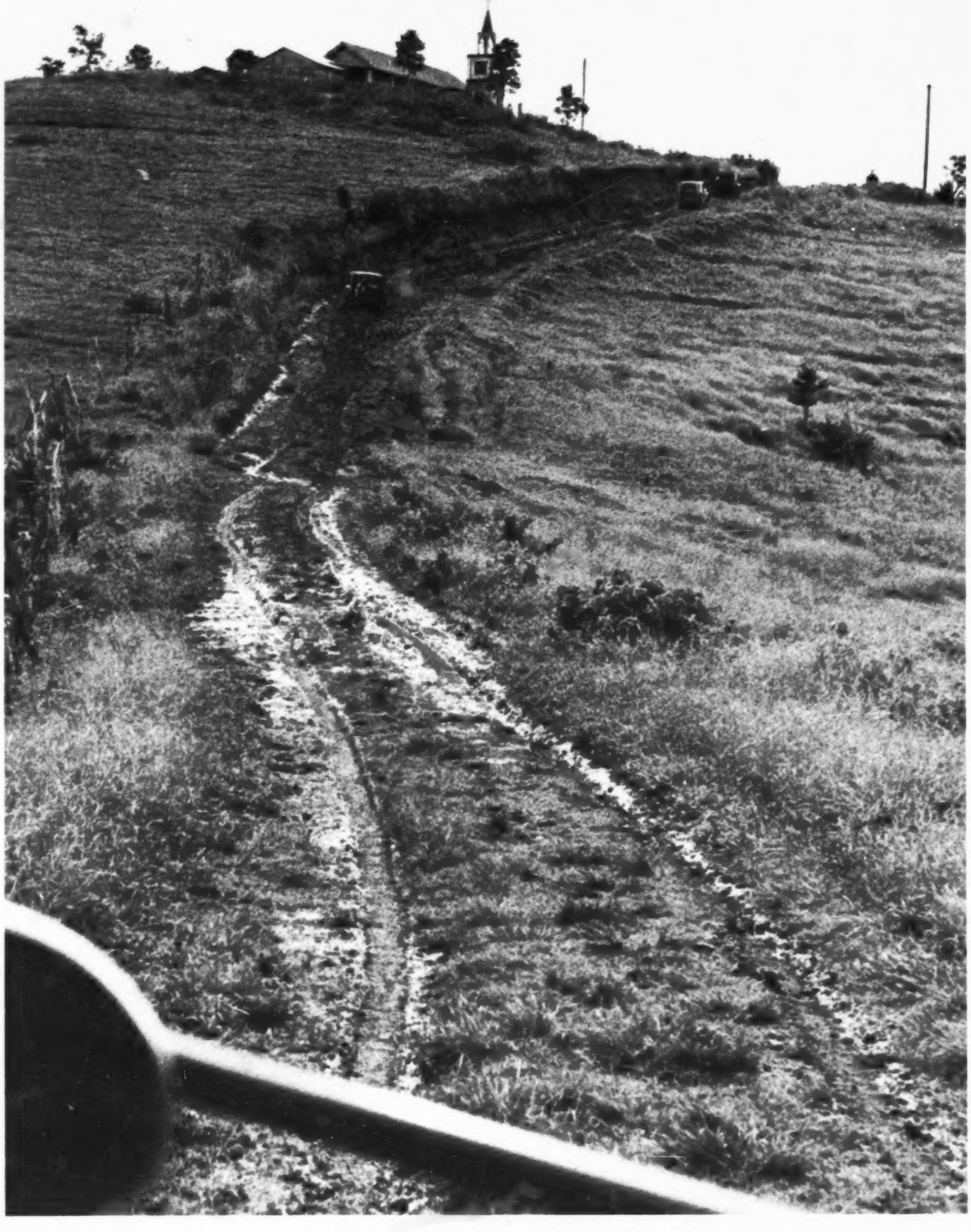


Figure 19—A sample of the old rutted, muddy road.

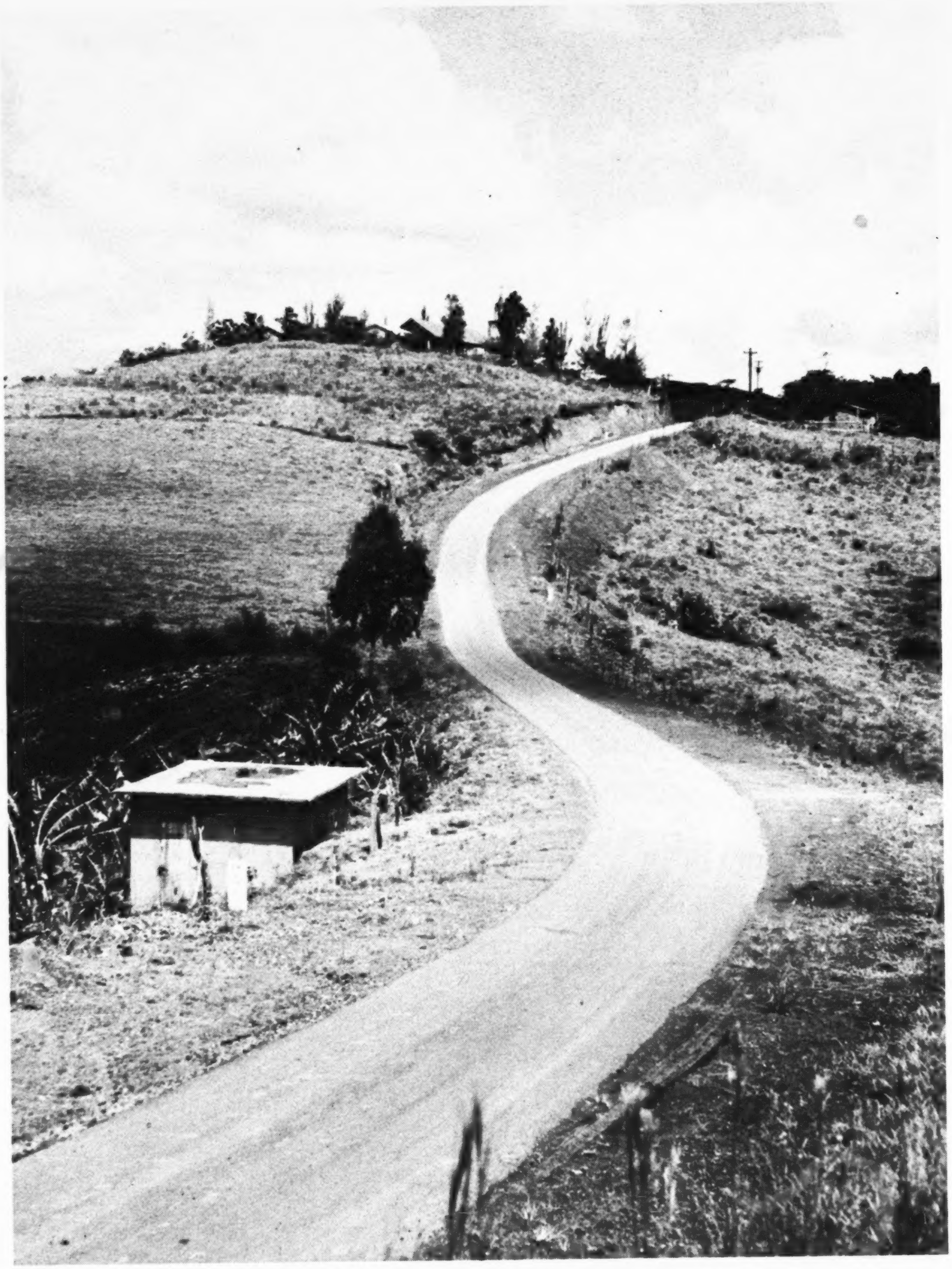


Figure 20—View of the same road, now paved.

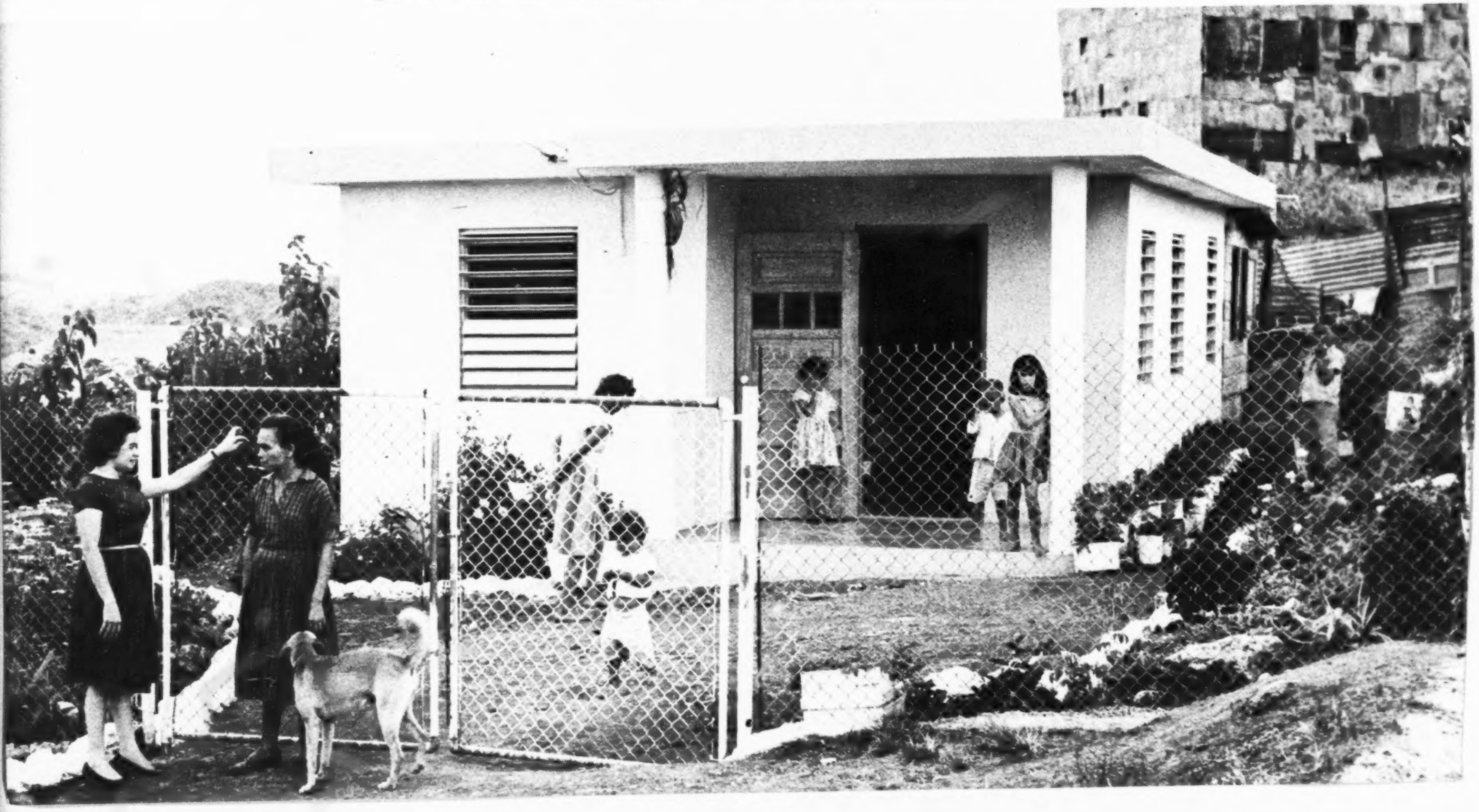
Housing

An interest in having better houses has been steadily growing during the five years. By the end of the third year most families had done something to improve their homes. Of the original families, 76 per cent were living in houses better in some respects than in 1958. Some had repaired floors, roof, or walls; some had built or repaired steps, and many had painted their houses. Some had made an extra room either by building on a room or dividing one to make two bedrooms—of special significance in improving conditions of sleeping—and a few families had built new houses.

Toward the end of the third year a major attack on the housing problem was undertaken. Encouraged by the growing desire among the people for better housing, the sponsors requested the Social Programs Administration to initiate a housing project in the community. This agency has two types of projects. In one it helps families that own their farms to build homes on their own land. In the other it acquires a tract of land, divides it into lots, and apportions them among landless rural families to form a Title V rural community. In both types the agency furnishes the cement and other building materials and its engineers direct the construction of the houses. The owner of the house make a minimum down payment, does the work of building of the house working cooperatively with a number of other families, and pays a small monthly sum until the house is paid for.

The first type of project was soon under way and 26 families now have new houses similar to that shown in Figure 21. For the second type, land has been acquired for the rural community and lots were distributed to families at a mass meeting on a Sunday afternoon at the home of a community leader near the location. A numbered list of persons eligible had been prepared and slips containing the numbers of the lots had been placed in a hat. Each man as his name was called

Figure 21—One of the new houses built with the help of the Social Program's Administration.



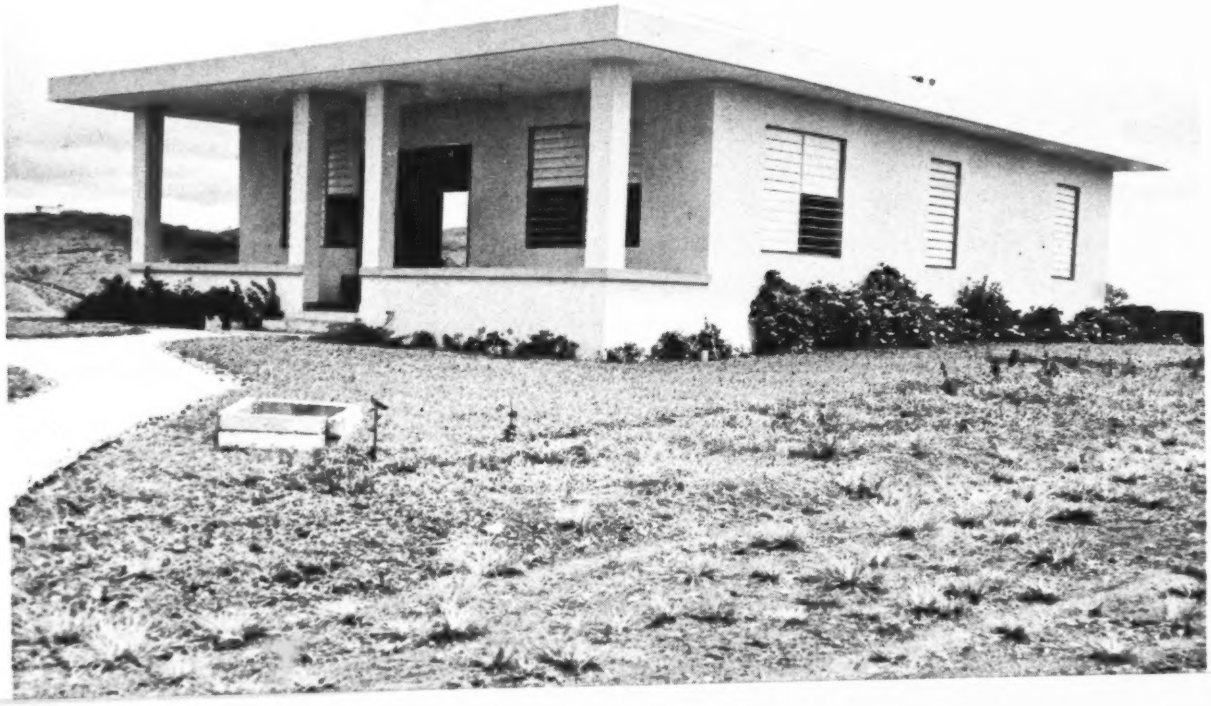
EDUCATIONAL PROGRAM WITH THE FAMILIES

Changes in the aspects of the program thus far discussed are the most easily evaluated for they are open to view and can be readily observed and their status noted. The situation is different when it comes to changes in patterns of living in individual families. Such changes are much more difficult to effect as well as more difficult to evaluate. People do not need to be made to realize that they should have such things as better roads, electricity, and a water supply. They merely need to be helped to attain them and encouraged to work together as a community in efforts to do so.

But improvements in such matters as the food supply of the family, the adequacy of the family meals, the care of children, the sanitation and cleanliness of the home and surroundings, and the general standards of living—these must be effected by each individual family. The essential facts regarding these can be taught to people in general or group meetings—if they are interested enough to come—and if the teaching is effective they may be motivated to go home and try to do the things taught. Even so they require much guidance and help to keep them motivated and working toward the desired goal.

As shown in preceding sections the community workers have been devoting themselves tirelessly to this task for the past five years, through general and area meetings of the people, in clubs of older boys and girls, with small groups of housewives and with individual families in their homes. Some families have responded readily to the teachings and have begun almost at once to put into practice the things suggested. This was the case of one of the community leaders. He was one of the first to plant a garden, to obtain a better milk cow, to start a flock of a better breed of chickens, to build a new kitchen, a cement stove and steps to the house, and finally, during the fourth year, to build a new cement house (Fig. 22). This

Figure 22—New house built by owner. Original house was similar to old one in Figure 22A.



drew a slip from the hat and thus obtained the number of his lot. Work is now underway on plans for building the houses. These families are now scattered among the mountains, many with only foot-paths to jeep roads. Bringing them together into a community will mean that they can be more easily supplied with lights, water and other facilities, as well as having easier access to town and schools. Each family will have about one-fourth acre of land and thus be able to raise some food crops. It is hoped that by working with these families and helping them to plan, this can be developed into a well-planned, livable and attractive community that will be a model for others to be built.

As a result of the interest aroused in the community for bettering their houses and the new houses already built, an outstanding improvement has already taken place in conditions of housing and the surroundings. Of the 90 families, 41 (45.6%) are now living in good cement houses; all but three of them have been built since the program started. About one-third of these houses were built by the owners, the remainder with the aid of Social Programs. Twenty other families have built new houses since the project started; 16 are of wood and 4 of "carton." These are mostly homes built by young married couples and regarded as temporary. Some of them will be replaced by cement ones when the new community housing project is completed. Even so, at the last resurvey, 60 of the 90 houses (67%) were rated as in good condition, 24 (27%) as fair and only 6 as poor (7%). In the 1958 survey 46 per cent of the houses needed repair or to be replaced by new ones. This improvement in housing is one of the most conspicuous signs of progress toward a higher standard of living in the community.

Surroundings. A vast change has taken place in the cleanliness and attractiveness of the surroundings. At the beginning of the program cans, papers, and other trash littered the surroundings of over three-fourths of the homes (77%). Now half of the patios are rated as very clean and all but two of the remainder as fairly so. Shrubs and flowers have been planted around 72 of the homes; 15 have enough to beautify the place, the remainder could use more; only 18 have none at all. The attractiveness and cleanliness of having grass around the house, instead of red clay which turns to mud after a rain, is gradually becoming appreciated, due largely to the attractive appearance of the project house. Sixteen families now have grass and others are planning to plant it, especially those with new houses. There is a widespread interest in the community for home improvement and beautification of surroundings.

Latrines. Latrines have added greatly to the cleanliness of the surroundings, but more importantly to the sanitation of the area. In the original survey only 8 families had latrines, the remainder (92%) used the ground. Hookworm and other parasites were highly prevalent and efforts to control them were useless until latrines could be provided. This being done, a parasite control program was carried out and treatment given to a large proportion of the people. In last check all 90 families had latrines; 34 of them, however, were rated as needing repair or some attention. It is evident that continued education is needed in the care and upkeep of latrines and that all efforts to control parasites must be continued if the community is to be fully free from them.

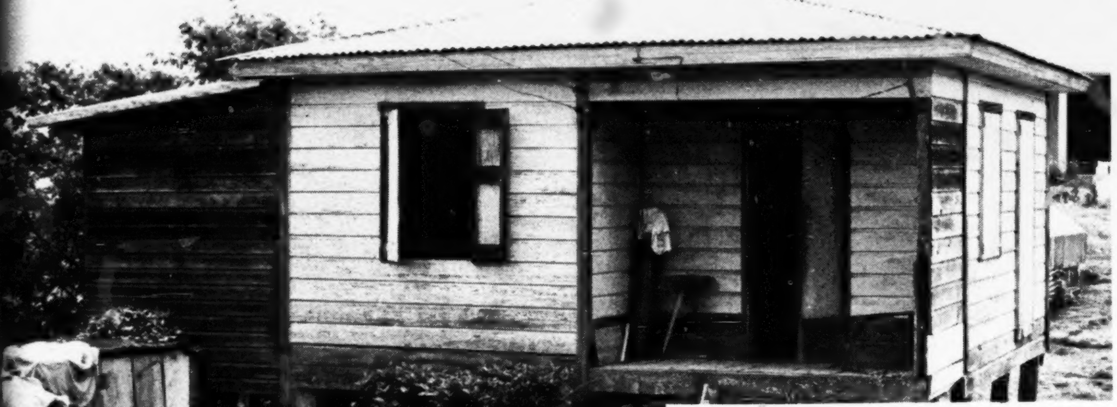


Figure 22A—The old house.

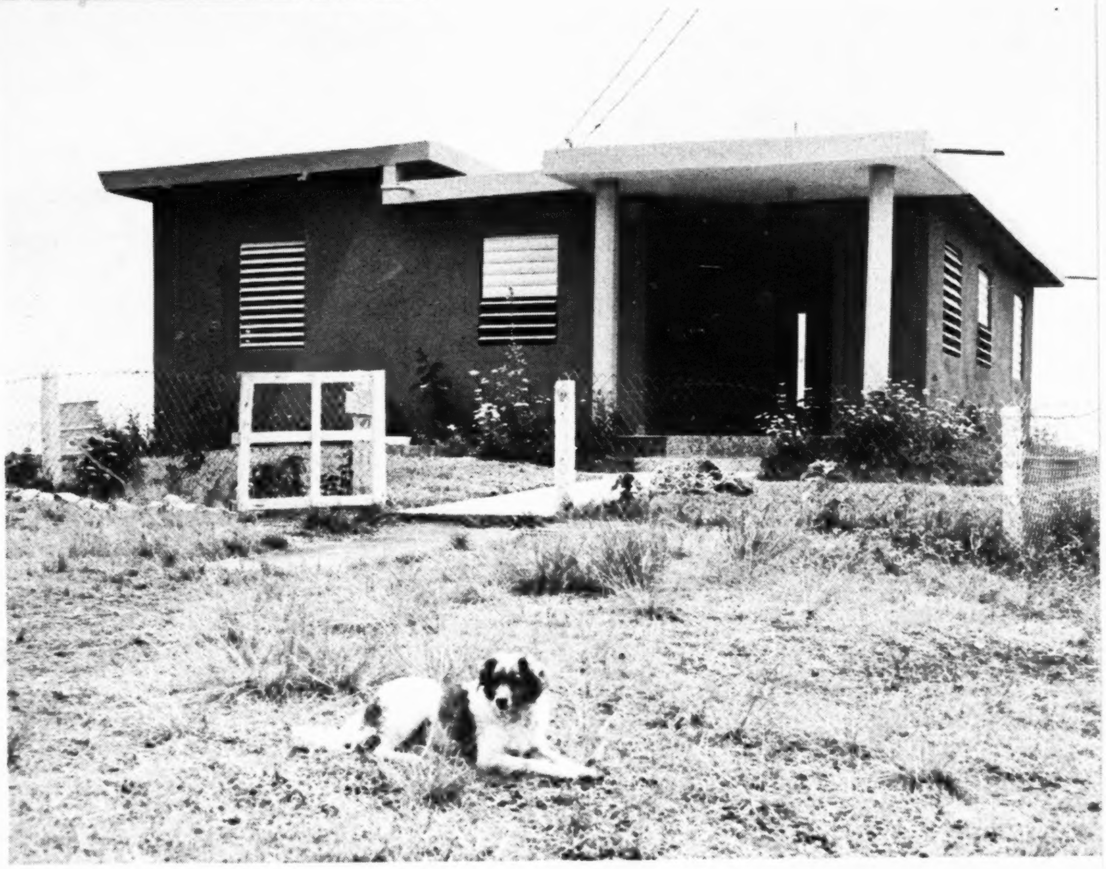
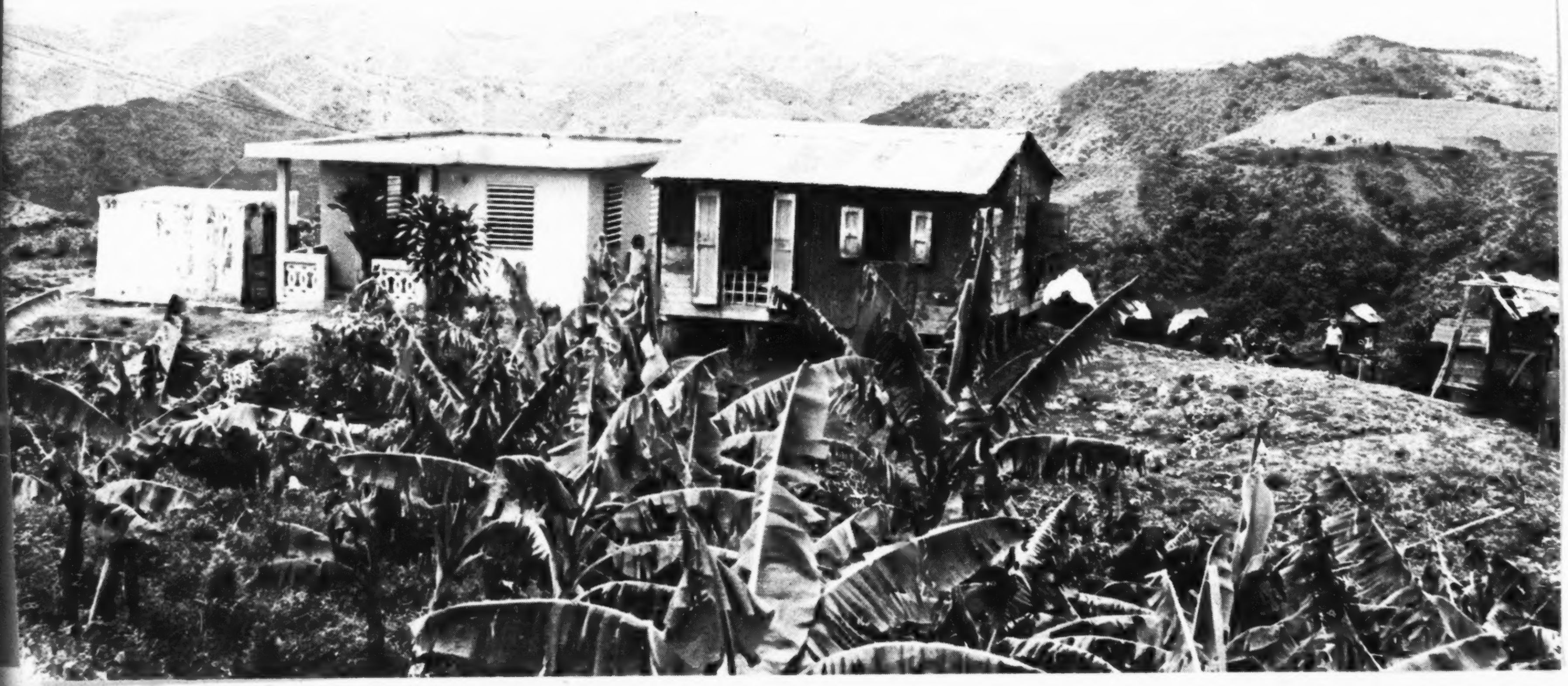


Figure 22B—The new one that replaced it. Note the grass, flowers, walk, fence, electric wiring.

Figure 23—New house beside the old one.



man was one of the better-off farmers financially, though far from well-to-do, but he had been content to live poorly like his neighbors until, through the influence of the project, he caught the vision of what better conditions of living could mean for his family. He then began, with the help of the community workers, to do everything possible to effect them. To the workers, the changes in the outlook on life and in the standard of living of this one family are alone almost sufficient to recompense them for all their efforts in the program. A gratifying number of other families have also responded similarly with equally marked progress. (Fig. 22-23.)

For the majority of the families, however, progress has come more slowly. In many cases the incomes are so low that the families can do little or nothing requiring money. These, as well as others, have become so accustomed to their drab existence that it is difficult to motivate them to desire to improve it. Little by little, however, most of these have been led to do some of the many small things that require little or no money and yet can add much to the comfort and satisfaction of living. Practically every family in the area is now living better in some respects than formerly, and most of them are now genuinely interested and trying to do what they can to improve their living.

One of the last to fall into line was a man with a bed-ridden wife and older son. The man welcomed the workers when they came to his home and listened politely to their suggestions but for the first three years made no attempt to follow them. Then he finally became interested and began eagerly to ask their advice and help, to improve his home, to plant flowers and grass around it, to try to prepare better breakfasts and have more eggs and milk for his family, and to do everything possible to better their living. This, too, was a highly rewarding result for the workers and it made them realize the truth of two old adages: "Rome was not built in a day," and "Constant dropping wears away a stone."

Home Food Production

The most difficult fields in which to effect, as well as evaluate, changes are those of the home food supply and the family meals. This is not surprising. They are not, first of all, things that can be done once and are over with, such as building steps or making a cement stove. They are activities that continue year after year and that require knowledge, time, money and sustained interest and effort.

Gardens. Gardens, for example, require land, money for seeds and insecticides, and knowledge of how to use them. Planting comes at a time when tobacco, the cash crop, needs attention. It requires strong motivation to induce a family to raise a garden under these conditions and this is not easily attained. It is difficult to offer convincing evidence that garden vegetables really contribute to the health of the family, since the effects are not readily apparent and since the family has thus far survived on the rice and beans diet. It must be admitted that the gardens raised so far may have been planted more from a desire to cooperate in the objectives of the project than from any "felt need" for them on the part of the families. Even so, the families that have raised vegetables have learned to like them and there is now a growing custom to plant them. When the 90 families now in the project were last visited, 27 of them had gardens planted and had had one for two or more years, and 23 others that had them the previous year were planning to plant them as soon as the tobacco had been planted. It would thus appear that at least these 50 families, or 56 per cent of the group, have started the custom of growing something other than just viandas. Another 18 familes (20%) that have not previously had gardens were planning to have them this year. Compared with only 6 families that had any vegetables growing in 1958, this is an encouraging record. The most common vegetables grown are calabaza, tomatoes, green beans, lettuce, cabbage and peppers. These are all good choices. Others that could well be increased are carrots and some kind of greens.

Yellow sweet potatoes, which were promoted along with calabaza as a much-needed source of vitamin A, have not had sufficient acceptance to justify continued efforts to induce people to raise them. The shoots given the families the first and second years were planted and the families having them professed to like them. Their desire to have them, however, was not sufficient to lead them to keep a continuing patch, as they do for white sweet potatoes. Planting of calabaza, on the other hand, has increased and at least 60 per cent of the families now have it growing, as compared with only 7 per cent that did at the beginning. Fortunately, the calabaza grown is of high quality with a thick flesh, deep yellow in color and rich in vitamin A value. A sample recently analyzed contained over 3800 units of vitamin A per 100 grams, or three and one-half ounces—about the amount in an average serving. It seems wise, therefore, to concentrate efforts on having all families plant enough calabaza to provide vitamin A for their families rather than continue emphasis on the less-liked yellow sweet potatoes.

Fruit Trees. No special program for providing fruit trees has been carried out since the first year, when, through the courtesy of the Department of Agriculture, four varieties of fruit trees were supplied to some of the families. Of these, acerola has shown the best survival; two-thirds of the families (66%) now have them (Fig. 24). Next best to survive were limes and the improved type of guava; over one-third of the families have them (lime 37%; guava 39%). Papaya did least well; only 18 per cent of the families now have live trees. This is far from the goal of these fruit trees for every family. But it does mean at least 150 more fruit trees in the area than were there at the beginning. Many families are anxious to secure trees, and helping them to do so should be a major objective in the future program.

Animals for milk and meat. Of animals for milk and meat, most progress has been made on chickens of better breed. The two methods first tried—(1) trading eggs of better breed for native ones, and (2) hatching eggs in an incubator and trading or selling the chicks—were only moderately successful. The third year arrangements were made with the Experiment Station to obtain live chicks from them at a low cost and a chicken project was started with club boys. The boys were taught how to build simple coops for the chickens and how to feed and care for them. They were then allowed to buy the baby chicks as they became available. The project has been enthusiastically accepted by the boys. Some families have also bought baby chicks from commercial sources. At the time of writing about two-thirds of the families (64%) have some start on flocks of better breed. Most of the flocks (41%) are as yet small—less than 10—but 20 families (22%) have 10 or more, 7 of them flocks of 20 to 38. A total of 1,200 baby chicks have been distributed in the area. Sixty per cent of them have been ones best for meat and part of them are already eaten. The present count shows 570 hens and chickens of good breed in the community. In terms of a commercial venture this would be "nothing to brag about" but in terms of interest aroused in the project and a start made on a better breed by so large a proportion of families, it is a real achievement. Perhaps when the road is completed this might develop in a source of income for some families.

Cows. The only major improvement in the home milk supply came from the cows of high milk-producing breed that were obtained by a few qualified families through the Government's Dairy Cattle Distribution Program described in an earlier chapter. These, plus some of their calves that have been kept, make a total of 13 cows of good breed now in the area. This means more milk for these families and a few others with which they share their supply. Many other families would like to have such cows but formerly could not qualify for buying them. Recently requirements have been liberalized and 17 more families will now be able to secure them. This should help materially to raise the level of milk supply for the community. Many families do not have enough land to support a cow. For some of these milk goats might be a solution, but as yet no interest in having them has been developed. Perhaps when the new parcelas are occupied this may be found to be feasible project for these families.

Family Meals.

It is difficult to assess improvement in family meals over a period without having a day-to-day record of the meals and the foods used. Some evidence can, however, be obtained from a comparison with the original 100 families of the types of meals eaten, family reports of the frequency of using certain basic foods, such as meat and eggs, and the quantities of milk used during the week. Although the two groups are identical for only about three-fourths of the families, differences noted in such comparisons are of some significance. All such comparisons give evidence of some improvement over the years. (Table 23.) This is evident especially in the breakfasts. In the 1958 study, 70 per cent of the families had only coffee for breakfast, for 15 per cent it was black; one-fourth (23%) had a cereal with café con leche, and 6 per cent had also a protein food. In the last recheck, 34 per cent had coffee only (for only 6 per cent it was black); one-half (50%) had a cereal or crackers with café con leche; and 16 per cent had these plus eggs (13.8%) or cheese (2.5%). On this basis the breakfast might be rated as: very good, 16%; good, 50%; fair, 29%; poor, 5%. This is an encouraging record though far from a perfect one.

The other meals also show some improvement, chiefly in the greater use of meat and eggs. On the day of the last interview nearly one-third of the families had meat in one or two meals, largely fried pork. This cannot be considered typical of the year, for it was the Christmas season and families had just killed a pig and were eating it twice a day while it lasted. The community workers, however, testify that there has been a significant increase in the use of meat since the coming of electricity to the area. The small stores can now keep fresh meat and families that can afford it are buying it. Families with refrigerators are also able to keep it at home.

Eggs, too, appear to be more used than formerly as shown in Table 24 and by the following comparison of the frequency of use in 1958 and 1963:

	TIMES USED PER WEEK		
	4 - 7 (%)	1 - 3 (%)	Practically never (%)
1958	35	18	47
1963	58	30	12

The proportion of families using eggs daily, or almost daily, has risen from 35 to 58 per cent and those that practically never have them has dropped from 47 to 12 per cent. This increased use may be fairly regarded, in part at least, to the greater number and better breed of chickens now in the area.

TABLE 23. TYPES OF MEALS, FIRST, SECOND AND FOURTH YEARS

Type	First* %	Second** %	Fourth*** %
Breakfasts			
Coffee only	70	39.8	33.7
Black	15	7.2	5.0
With milk	55	32.6	28.7
Coffee with milk plus cereal or other carbohydrate food	23	47.0	50.0
Coffee with milk, cereal and a protein food	6	9.6	16.3
Other types	1	3.6	—
Lunches			
Viandas the basis	96	86.7	90.0
Viandas only	22	2.4	3.8
Plus protein (not codfish)	10	9.6	27.5
Plus codfish	43	50.6	36.2
Plus other protein and codfish	14	24.1	22.5
Plus other food, not protein	7	—	—
Other types	4	13.3	10.0
Cereal with milk	—	13.3	—
Cereal or viandas with protein food	2	—	—
Other	2	—	10.0
Dinners			
Rice and beans the main dish	90	75.9	86.7
Rice and beans only, or with carbohydrate	65	39.8	23.4
Rice and beans plus a protein food	25	36.1	63.3
Other types	10	24.1	13.3
Rice or viandas plus protein	5	8.4	—
Soup or asapao	4	9.7	—
Rice only	—	6.0	—
Other	1	—	—

**100 families* ***90 families* ****90 families*

TABLE 24. USE OF MILK AND EGGS BY FAMILIES SECOND AND FOURTH YEARS AS COMPARED WITH FIRST

	Aug. 1958 %*	May 1960 %**	1962 %***
Milk per person			
All families	100.0	100.0	100.0
Less 16 ounces	67.0	58.6	57.2
None or less 4	12.0	16.0	4.8
4—7	10.0	14.6	13.1
8—11	26.0	17.3	16.7
12—15	19.0	10.7	22.6
16 and over	33.0	41.4	42.8
16—23	17.0	26.7	29.7
24—27	8.0	6.7	6.0
28—31	5.0	1.3	1.1
32 and over	3.0	6.7	6.0
Eggs. Times per Week used			
All families	100.0	100.0	100.0
Four to seven	35.0	32.9	58.3
Two to three	13.0	21.5	20.2
Once	5.0	11.4	9.5
Practically never or never	47.0	34.2	12.0

Milk consumption would also seem to be rising to some extent, as seen in the comparison of the amounts used by families in 1958 and 1963 (Table 24) and as summarized below:

	Less than 12 oz. (%)	12 - 15 oz. (%)	16 oz. and over (%)
1958	48	19	33
1963	34	23	43

The proportion having less than 12 ounces per capita was 48 per cent in 1958, 34 per cent in 1963. Those having 12 ounces or more was 52 per cent in 1958, 66 per cent in 1963. This small improvement is doubtless due in part to the few better cows that are now in the area, and also to the dry skim milk provided some families.

Community Spirit.

It is evident from the foregoing that marked changes for the better have taken place in the physical aspects of living in this community during the past five years. More important than these, and basic to them, has been the change in the spirit and attitude of the community. There is now a spirit of hope and optimism, and a general desire on the part of the people to improve their conditions of living. If these can be sustained they should enable the people to carry on the work that still needs to be done to raise the standard of living for all families, and to make Doña Elena a model rural community in all its aspects.

The Work Ahead

What of the future of this community? How soon will it be able to "go it alone" or with such help as the workers in the regular government agencies can give to it? It has been the intention gradually to reduce our intensive services as soon as the community seemed ready for it. Instead of having the workers living in the community and devoting full time to it, they would be moved to another isolated area needing help but would return to Doña Elena at weekly or biweekly intervals to give such help and guidance as needed to sustain the spirit and morale and to encourage the people to carry on. It had been planned to begin to do so this year. However, the coming of the road and the establishment of the Title V community introduced new problems. It seemed wise, therefore, to continue the workers there until the families are well established in the new community and all of Doña Elena oriented to its changed conditions.

Much of the work ahead will thus be concerned with these problems. In cooperation with Social Programs Administration it is hoped to inspire the families of the new community to want to make it a clean, attractive, and wholesome one where people live together as good neighbors and work together to make it the kind of community they want it to be. To do this they must be led to consider the problems involved and plan how to deal with them, as: What difference does it make when people come to live near each other in a community instead of out in the hills by themselves? What does it mean to be a good neighbor? What kind of community do they want theirs to be? What do they want it to look like? What facilities will they need in the way of stores, garbage disposal, recreation and social centers for various age groups? What kind of moral and social standards do they want to prevail? How can they organize the community to work together to make it the kind of place they have visualized it to be? All Doña Elena families as well as the new community must also plan how all can work together for the common good.

Leading the people to consider these and other questions will require many meetings and much follow-up work with individual families. This will require all the time and abilities that the workers of the two agencies can devote to it, as well as that of specialists in specific areas that they press into service. Meanwhile there is much to be done in the regular program that has been under way. In some aspects the people are now ready to carry on, especially for public utilities such as roads, water, electricity, and housing. For others, especially those concerning individual family living, they still need educational guidance.

There is need, first of all, to strengthen the home food production program. Families in the Title V community will have enough land on which to plant a garden, and a row of gandules, and to raise enough chickens of good breed to supply eggs for the family. They may also be able to keep rabbits for meat. Since they will be living close together it will be easier to stimulate them to have these things and to help them to secure them. Families with land of their own also need continued education and encouragement to raise gardens and to increase their flocks of good breed hens, until having them has become a habitual practice.

There is need also to work more effectively toward the improvement of family meals. There is no intention of trying to change the basic dietary pattern but merely to supplement it with foods that are now deficient, especially vegetables, fruits, and high quality protein foods. As has been noted some progress has been made to this effect, but far from what it should be. We need some graphic, effective methods of convincing the families, especially the house-wives: (1) that vegetables other than viandas, and fruits contribute nutrients essential to the nutrition and health of the family; (2) that it is important to start the family off in the morning with a good breakfast, and what makes a good one; (3) that all members of the family need some high quality protein food daily, and that eggs, milk, meat, fish, fowl or the flesh of any animal will supply it. They need to be taught how to prepare appetizing dishes using these foods and how to plan the day's meals to include them. All these things have been stressed in the past but more effective methods must be devised if they are to become an accepted part of the dietary pattern. Only if the people are really convinced of the importance of these things will they put forth the efforts necessary to obtain them.

Other areas needing increased attention are health, income, and facilities for recreation and social activities. Health has always been a problem. For over a year a nutrition clinic for infants and pre-school children was conducted in the community as a special project by a physician and nutritionist from the Department of Health. It was hoped that the Comerío Department of Health would be able to continue it, but shortness of staff and the lack of jeep transportation made it impossible to do so. The new road will remove the transportation problem, and it is hoped that the clinic may be revived. In any case the road makes it easier for people to get to the health units in the towns.

Most of the families need better incomes to sustain a decent standard of living, especially those in the Title V community and others with only small plots of land or none. Ways and means of providing sources of income for these must be explored and the most feasible ones tried. Could some small industry perhaps be located here? Would a chicken project be adapted to this community? Could some specialty products that require little land be grown and marketed cooperatively, such as peppers, onions, gandules, flowers, or other ornamentals? All of these products are in demand and the prices high especially in the off-season. A well-organized program for producing and marketing one or more of them or some other suitable product might add materially to the income of some of these families.

The problem of recreation becomes especially urgent since the coming of the new road has made easier access to the towns and with it the temptation, to the youth especially, to seek their amusement there, too often of the undesirable type. Helping the people to plan for a playing field for youth, play places for children, a community center for social and cultural activities, and planning with the people how to use and care for them, should therefore be one of the major objectives for future work.

Through all these activities the ultimate purpose should be to lead the people to take the responsibility for their own and community welfare, so that they may eventually continue by themselves with such advice and help as the workers in the regular government agencies can give them. These local agency workers, it must be remembered, are responsible for the entire municipality which they serve and all its barrios in which there are several other isolated "pockets" similar to what Doña Elena was when the project started. Their workers are too few in number to give intensive service to any one community. With the road to Doña Elena completed, a water supply and electricity provided, and standards and procedures well established through the several years of the intensive program, these agencies should be able to extend to this community the activities and services that will encourage and help them to carry on.

LARGER OUTCOMES OF THE PROJECT

The time and service of many people, as well as a considerable amount of money, have gone into this project during the past four years. The question may well be raised, was it worth it? The answer would probably be "no" if the results for only these few families are considered. But they have a much wider application. There are many other similar areas in Puerto Rico, and this pilot project has focused attention on the problems of such areas and revealed the necessity of making greater attempts to solve them.

The most gratifying outcome of the project has therefore been the establishment of a program to extend the same type of service to other areas. From the beginning the Governor was repeatedly asking, "How many more 'Doña Elenas' are there in Puerto Rico?" The sponsors, therefore, undertook an informal study to find the answer. They went to various municipalities and obtained from workers in different agencies familiar with the area—chiefly Public Welfare, Extension Service, and the Schools—their estimate of the number of communities in their municipalities that were similar to Doña Elena, especially in respect to bad roads, difficulties of access, lack of water and sanitary facilities, and the services of agencies. Visits were made to 31 of the 76 municipalities. In these, 250 such isolated communities were reported by the agencies with an estimated total of 15,000 families. There are at least 20 to 30 more municipalities in the highlands that would undoubtedly have similar communities. If we assume that the same conditions prevail in these as found in those visited it would mean that there are probably 400 to 500 such isolated communities in the Island with a total of some 25,000 to 30,000 families. Since the families are generally large, this would mean a population in the neighborhood of 200,000 persons. Whether this is an over- or under-estimate, the number is large enough to deserve consideration.

The Commission for Improvement of Isolated Communities.

Faced with the size of the problem the Governor was resolved to do something about it. Through his interest and influence a law was passed by the Legislature in July 1960, setting up an initial fund of $300,000 to extend programs similar to that carried out in Doña Elena to other isolated areas, and establishing a Commission of seven members appointed by the Governor to administer it. (Law 139.)

Three of these members are Doña Elena sponsors, the others are the cabinet heads of Health, Agriculture, Public Works, and the Planning Board. An Executive Director was employed to carry out the program decided upon by the Commission. One of the Governor's aides was appointed by him to serve as a liason officer to facilitate communication between him and the Commission.

The first year the Commission started programs in 5 isolated communities in different towns of the Island—Lares, Ciales, Juana Diaz, Naguabo, Ponce. The organization followed in general the Doña Elena pattern. Two workers, a home economist and an agronomist, were employed to live in the area and carry out the day-to-day aspects of the program. As in Doña Elena a house was found which was repaired and made livable, and the surroundings cleaned and made as attractive as possible. This house serves as the headquarters for workers, and a living place for the home economist. To provide as nearly as possible the type of support and assistance to the local workers as the sponors had given at Doña Elena, an Action Group was set up in each of the municipalities in which a community was located. This Action Group consists of the heads of all agencies that have any responsibility for the welfare of the community. It includes the Superintendent of Schools; the heads of Public Welfare, Public Works, the Health Unit, and the Agricultural Extension Service; the Mayor; and any others who might be useful to the program. This Action Group gives guidance and help to the resident workers and serves as the agency through which the Commission under its Executive Director works on problems of roads, water, sanitation, health services, and other all-community problems. In each isolated community the people have chosen a group of 5 to 7 leaders from various sections of the area to serve as a local council to represent them. A chart showing the organization of the Commission is given herewith.

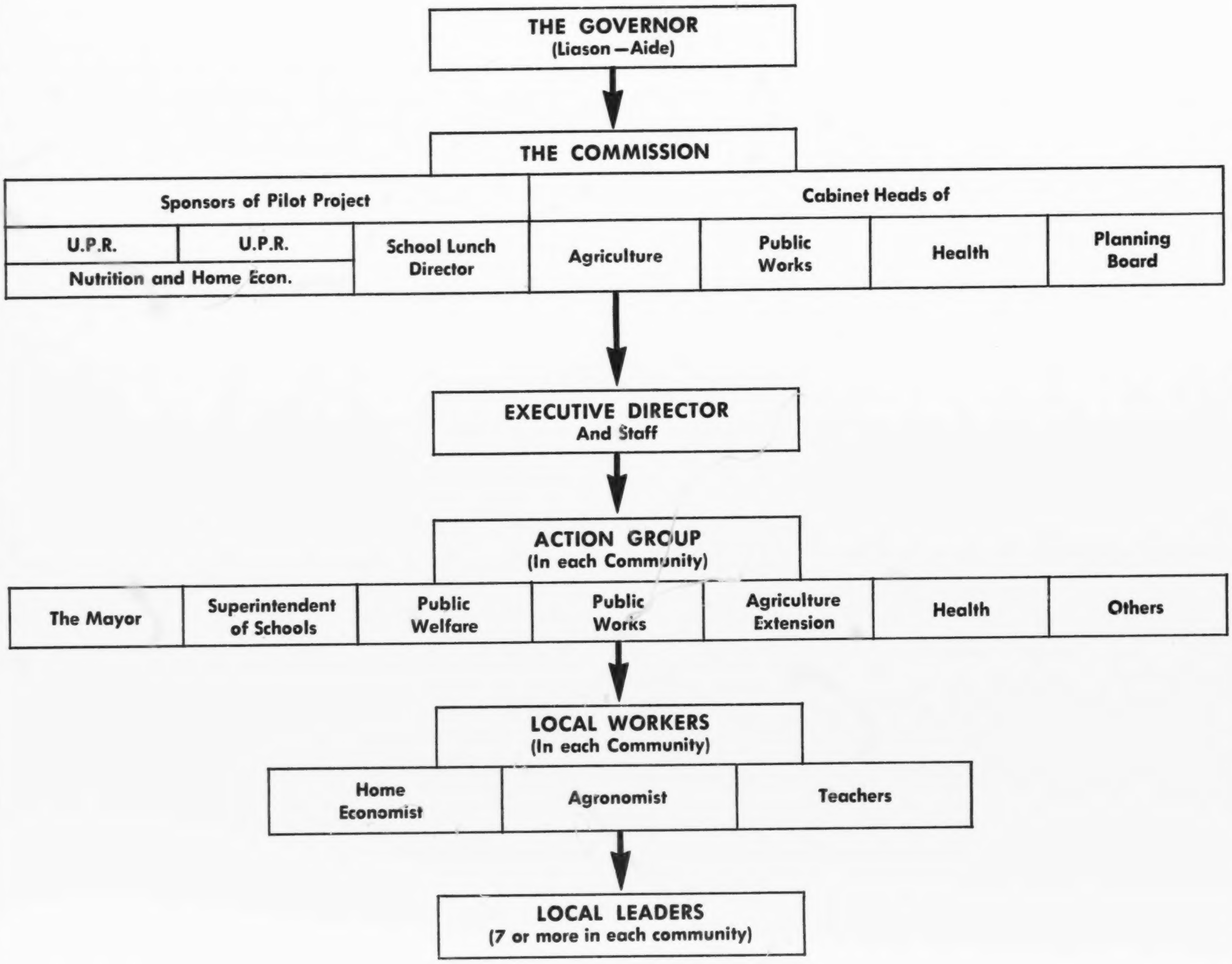
The second year an additional appropriation made it possible to add 10 more communities to the program. Doña Elena was also taken over by the Commission, making a total of 16 communities in which work was under way. Each year increased appropriations provide for adding new communities. At the time of writing, programs are being carried on in 21 communities, and plans are being made to take on 14 additional ones in the near future. All are in different municipalities. After the first year communities have usually been selected in response to requests from some leader or group in the municipality, after a preliminary visit to the proposed area has indicated that it qualifies for the program. An Action Group is then organized, and a meeting held with the people in the community to explain the purpose and nature of the program and to insure their interest and cooperation. These assured, a local leader council is chosen by the people and the home economist and agronomist are located in the area.

The first step in the program in each area is to visit every family, as was done in Doña Elena, and obtain interviews on all conditions of living; family make-up, income, education, diets of the families, home food production, and other factors. The findings are tabulated and used as a basis for the work with the people. Meanwhile the Executive Director is working with the local leaders, the Action Groups, and the various public agencies — Public Works, Health, Water Authority, Aqueducts, Social Programs — on problems of roads, water, electricity, health facilities, housing, and other over-all problems.

Significant progress has already been made in various aspects. Roads are under construction or completed in twelve areas and studies are under way in nine more. Aqueducts have been constructed in two areas, and plans are being made in others. Electricity has been supplied to families in ten communities and projects are under construction in another six. Parasite surveys have been made in 16 communities and in five other communities are now being made. Treatment for parasites has been given to a large proportion of infected persons. A housing program under Social Program Administration has been established in two communities, and others will soon be added. In the communities the people are responding well to the program for improving farming practices, cleaning and beautifying surroundings, planting vegetable gardens, and other things that families can do for themselves. Above all, there is a spirit of optimism and hope among the people that should keep them working to make their communities healthful and wholesome ones in which to live.

Figure 24—Carmen, Antonio and the housewife picking acerolas from one of the acerola trees given the family in 1958.

ORGANIZATION CHART OF COMMISSION FOR IMPROVEMENT OF ISOLATED COMMUNITIES


THE GOVERNOR
(Liason—Aide)
THE COMMISSION
Sponsors of Pilot Project
U.P.R.
U.P.R.
Nutrition and Home Econ.
School Lunch Director
Cabinet Heads of
Agriculture
Public Works
Health
Planning Board
EXECUTIVE DIRECTOR
And Staff
ACTION GROUP
(In each Community)
The Mayor
Superintendent of Schools
Public Welfare
Public Works
Agriculture Extension
Health
Others
LOCAL WORKERS
(In each Community)
Home Economist
Agronomist
Teachers
LOCAL LEADERS
(7 or more in each community)

PART VI

SUMMARY

SUMMARY

The project herein reported has been under way in a rural community in a mountain barrio of Comerio, Puerto Rico for the past five years, and is still in progress. It was undertaken primarily as a nutrition demonstration but soon developed into an all-round program for better family and community living. The community chosen was an isolated one typical of many others in Puerto Rico. It was characterized by miserable roads which could be travelled only by foot, jeep or horseback; large families with low incomes; inadequate diets; bad housing conditions; lack of water, lights, sanitary facilities and health services; and by the almost total lack of services from government agencies except for a school. A program for helping the people to improve conditions was undertaken under the sponsorship of the Puerto Rico Nutrition Committee. A sub-committee of this Committee served as directors of the project.

Two workers were employed to live in the area, a home economist and an agronomist, to carry the day-to-day work with the families. The directors of the project gave them help and support, as did also the Superintendent of Schools, the Mayor, and the Extension Agents of Comerío. Persons chosen by the people of five different sections of the community to represent them served as a local council for the area.

The nutrition program centered around the school. The children were fed three meals a day on school days. They were weighed weekly, their heights taken monthly and their progress compared with that of a matched group in a similar area. A nutrition educational program was carried on with children in the school, and with parents in meetings and in their homes and efforts were made to improve the family food supply through raising gardens, fruit trees, and animals for milk and meat. In addition the program soon became concerned with problems of roads, water, sanitation, electricity, housing, and other things needed to improve the living conditions of the people. This summary reports the results for the first five years.

The Nutrition Program in the School

Changes in the School.

In order to carry out the nutrition program some changes in the school were essential.

1. The school was divided into three rooms, three teachers were employed, and a full-day session provided for all children.
2. Teachers were chosen for their interest and willingness to cooperate in the project. Through their efforts the school rooms and surroundings were made attractive and inviting, the teaching improved, and the school a pleasanter place for children to come.
3. A new lunchroom was built and additional workers employed to prepare and serve the three meals. Through the work of the teachers, the lunch-room workers and the home economist
   a. Attendance of children at school showed marked improvement. The first year only 37% of the children were in school 80% or more of school days. The second year this proportion had increased to 77%, and the following year to 88%. Attendance is now no longer a problem.
   b. The proportion of children eating all the food served them on 80% or more of the days they were present rose from 11% the first year to 81% the second and to 90% or more the fourth year.

All these changes contributed to the better nutrition of the children.

Growth of Children.

The majority of the children have shown improved growth by several standards.

1. The first year 60 Doña Elena children were matched with an equal number of controls for age, height and weight. Their gains for the year surpassed those of the controls by three criteria:
   a. Their average gains per child per year were greater by amounts equal to one-third of a year's expected increment, in both height and weight.
   b. A larger proportion of individuals made their expected gains or better:

	Expected or Better (%)	20% or More over expected (%)
In height		
Doña Elena	82	58
Control	42	16
In weight		
Doña Elena	85	64
Control	40	22

   c. In gains of individual partners in the matched groups, Doña Elena "won" in 46 of the 60 pairs, or 76%, in both height and weight.
2. The second year progress was evidenced by the exceptionally good gains by Doña Elena children.
   a. 90% of them gained their expected amounts in both measurements.
   b. 46% exceeded their norms in height by 10% or more, 28% of them by 20% or more.
   c. 58% exceeded their norms by 20% or better, 22% of them by 50% or more.

3. The third year 25 of the original matched pairs were available for comparison, and results were similar to those for the first year.
   a. The average gain per child of the Doña Elena group was greater than that of the controls by amounts equal to one-fourth to one-third of a year's normal increment.
   b. A larger proportion made their expected gains or better in both height and weight.
   c. In the individual pairs, the Doña Elena child gained more than his partner in 64 per cent of the pairs for height and in 68 per cent for weight.

From these results it seems justifiable to conclude that the program had helped materially to improve the nutrition and growth of the children.

Diets of the Families.

1. Improvement in family meals is most apparent in the breakfasts. Half as many breakfasts now consist of coffee only as did in the original survey (34 vs. 70%). More than twice as many have a cereal and coffee with milk (50 vs. 23%), and over twice as many have eggs or other protein food in addition.
2. Improvement in other meals is chiefly noted in the fewer lunches that consist only of viandas (4 vs. 22%); fewer suppers of only rice and beans (23 vs. 65%); and an increased use of some protein food (63 vs. 25%) in suppers.
3. Eggs are now used in greater amounts. The proportion of families practically never having them has dropped from 52 to 12 per cent, and those having them daily, or nearly so, has risen from 35 to 58 per cent. This increase can fairly be attributed to the increase in the number of hens, especially ones of good breed.
4. Meat is used more often by families that can afford it, due to its greater availability in the local stores since the coming of electricity and refrigerators have made it possible for them to keep fresh meat.
5. Milk, too, shows some increased use; 43 per cent of the families average one pint or more per person, versus 33 per cent that did in the earlier study, and the proportion having only one cup or less has dropped from 48 to 34 per cent. This can be attributed in part to the few better breed of cows introduced into the area, and also the increased use of dry skim milk.

These are small but significant indications of a trend toward more adequate diets. Hopes for greater improvement lie in a more vigorous home food production program, and a continuing but more effective education of the housewives in the nutrition needs of their families and how to prepare meals to supply them.

The Educational Program with Families

Home Food Production.

The goals set at the outset for home food production have fallen far short of achievement. Yet compared with the situation at the beginning, the results are encouraging.

1. *Vegetable gardens.* At the outset only six families had any vegetables growing. At the last check, 50 families (56%) had gardens—or were about to plant them—and had had them for two or more years. At least this number appear to have begun to form the habit of planting vegetables other than viandas.
2. *Fruit trees.* Of the fruit trees distributed the first year, not all have survived. But 57% of the families now have acerola; 39, guava; 37, lemon; 18, papaya. This means at least 150 more fruit trees in the area than were there before. Guavas also grow wild in the area, and "wild" oranges are fairly available to many families.
3. *Animals for meat and milk.* Of the animals for meat, chickens have shown the best results. Formerly chickens were few and none were of good egg-producing breed. Now nearly two-thirds of the families (64.4%) have at least a start on flocks of good breed and others are interested in having them.

   Through the benefit of the government's program there are now 13 cows of higher milk-producing breed in the area. About 17 more families will soon be able to secure them. These will effect a marked increase in milk for the community.

   Little progress has been made in the original plans for raising rabbits for meat and goats for milk.

Housing and Home Improvement.

Outstanding among the changes effected by the families have been those of housing and related factors.

1. At the beginning a large proportion of the houses were small and in poor condition, needing repairs or to be replaced by new ones. Now 41 per cent of the families are living in new cement houses, and others in new ones of wood. Nearly all of the remainder have improved their houses in some respects.
2. Then, 93% of the kitchens were miserable sheds. Cooking was done on a three-stone fogon. Now practically all families have new or improved kitchens and some type of smokeless stove: 11 per cent have gas, 60 per cent kerosene, and 29 per cent a cement stove.
3. Then only 9% of the families had latrines, the remaining 91% used the ground, a ditch or nearby stream. Now all families have sanitary facilities.
4. Then the surroundings of only 23% of the homes were fairly clean, the remainder were littered with papers, cans and other trash. Now nearly all families have cleaned their surroundings, and are making reasonable attempts to keep them clean. Most of them have planted some shrubs and flowers and an increasing number are now planting grass around their homes.
5. The standards of housekeeping have risen markedly. Now a large proportion of homes are cleaner and more orderly and the housewives themselves tidier in appearance.

Most important of all is the general desire of practically all families in the area to better their housing and other conditions of living and the efforts they are putting forth to attain a higher standard of living.

Community Facilities

Benefits to all families in the area have come from improved community facilities.

Electricity.

When the program began there was no electricity in the area. The first year it was made available to about one-third of the families, and each succeeding year to a few more. Now it has reached all sections and nearly all families now have electric lights, a large proportion have radios, and a considerable number have electric irons and a few have refrigerators.

Roads.

The greatest boon to the people has been the improvement of roads. When the project started access to and from the community were over a rough, winding jeep trail, often impassable. Now there is a paved road over which the families can travel and convey their produce both to Comerío and Naranjito.

Water.

At the outset practically all water had to be carried from a spring or well at some distance. Only 9 per cent of the families had even a device for catching rain water. Now nearly all families have eaves and drums to catch water from the roof. An aqueduct has recently been constructed that will soon make water available to 80 per cent or more of the families and also to the school.

Attitude and Spirit of the Community

The above are tangible things that can be measured. More important than these and basic to them is the change in the attitudes and spirit of the community. Where formerly there had been a general attitude of hopelessness, that nothing would ever happen to better their lot, there is now an uplift in spirit and optimism that can be felt though it cannot be measured. Doña Elena, as the residents will tell you, is not the same place as it was before.

Figure 25—Junction of new paved roads from Comerio and Naranjito (left). Road continues left to school.